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Foreign War Orders Loom Large

Calling for Heavy Tonnages of Shrapnel and Other Materials—Pig Iron Market Dull Following Sale of 300,000 Tons by Buffalo Furnaces

War orders of tremendous size are pending, including guns, ammunition and other supplies. Orders for machine tools by domestic manufacturers who have booked contracts for war materials are very heavy and include 500 machines, mostly lathes, ordered by the American Locomotive Co., to make shrapnel shells for the Russian government. Numerous small orders for machine tools, including some from railroads, have been placed and many others are pending. Nearly all lathe manufacturers have advanced their prices.

The United States Steel Corporation is now operating at slightly better than 70 per cent of ingot capacity. Nearly all companies report March business shows a very comfortable increase in mill orders, as compared with February. Warehouse business is also improved.

Ferro Manganese

The arrival of 1,000 tons of ferro-manganese from England has given users reasons for hoping that regular shipments will soon be resumed, but the situation is not yet entirely clear, as it is intimated that the recent shipments were to favor companies working on war orders.

Pig Iron

Following the recent whirlwind campaign by Buffalo furnaces, which resulted in the sale of nearly 300,000 tons of pig iron, the United States Cast Iron Pipe & Foundry Co. has quietly purchased a large tonnage. One seller booked 40,000 tons and all the purchases of the company may have amounted to 100,000 tons. With the exception of the buying of this pipe iron, the pig iron market has been very quiet since the buying of Buffalo iron ceased. Consumers naturally are hoping to obtain low prices somewhere near the Buffalo basis. While some weakness has developed, furnaces generally are not disposed to follow the lead of the Buffalo furnaces in selling at extremely low quotations. Of the total Buffalo tonnage, 50,000 tons was purchased for speculative purposes and is to be placed in warehouses.

Prices

The difficulty of establishing a general advance on finished materials on a Pittsburgh basis in anything except a period of decided prosperity is again being demonstrated. On the three leading products, plates, shapes and bars, 1.15c, Pittsburgh, for March delivery, has been well maintained on bars throughout the country, but in eastern territory that price has been shaded on shapes, and as low as 1.05c, Pittsburgh, has been done in Chicago on plates for early delivery from an Ohio mill. Notwithstanding these irregularities, leading makers of plates, shapes and bars in Western Pennsylvania are firm in the determination to quote 1.20c April 1 for second quarter shipment, and it seems probable that important companies will announce 1.25c as the price for third quarter.

Sheets

The action of the Amalgamated workingmen in accepting at the third referendum the proposed reduction in wages in sheet and tin plate mills has resulted in a general resumption. Galvanized sheets are a trifle easier and 3.30c on No. 28, Pittsburgh, can be done on desirable business. Some recent sales of sheet bars have been made at as low as $18.50, Youngstown, but during the past few days, quotations have advanced and sales made at higher prices.

MEN OF MACHINERY TRADE

Who they are Where they are What they are doing

W. S. Thomas, treasurer of the Wagner Electric Mfg. Co., St. Louis, has been also elected a vice president.

J. B. Cornell, assistant treasurer of Niles-Bement-Pond Co., Inc., 111 Broadway, New York, is expected to return shortly from a trip to Italy.

James A. Gish Jr. has become affiliated with the Nebraska Portland Cement Co., Superior, Neb., in the capacity of plant manager.

Alfred C. Nelson announces that he has opened offices in the Rockefeller building, Cleveland, O., as consulting and contracting engineer.

J. W. Fogg, formerly master mechanic of the Baltimore & Ohio Chicago terminal, has become associated with the Boss Nut Co., with headquarters at Chicago.

Axel Bonthron, representing the firm of Axel Ryden, machine tool dealers, of Stockholm, Sweden, sailed for home in March, after a two months' stay in this country.

G. M. Hardt, who has just come to this country from Paris, is making inquiries on a considerable quantity of equipment for making shrapnel. He is staying at the Hotel Astor, New York.

Eivind Erichsen, mechanical engineer, has sailed for Russia, where he will look after the interests of the Allied Machinery Co. of America. Mr. Erichsen will make his headquarters in Petrograd.

George K. Atkinson has associated himself with the Steinle Turret Machine Co., Madison, Wis. He formerly was with the John Steptoe Shaper Co., and later was manager of the Modern Machine Tool Co., both of Cincinnati.

Sir Arthur Trevor Dawson, managing director and vice chairman of the Vickers-Maxim Co., of England, has arrived in this country to give attention to matters connected with ordnance manufacture for the English government.

Milton C. Stuart, assistant steam engineer for the Cambria Steel Co., Johnstown, Pa., has been appointed mechanical engineer in the United States naval engineering station at Annapolis, Md., where he will begin his new duties about April 1.

James D. Wilson, former president and general manager of the Montague Iron Works Co., Montague, Mich., and Martin Hausler, of South Chicago, Ill., have taken over the interests of the Montague Iron Works Co., and will continue the business along the same lines as in the past.

E. A. Stillman, president of the Watson-Stillman Co., maker of hydraulic machinery, 50 Church street, New York, left on March 27 on the steamship St. Paul. Mr. Stillman is on a business trip to England and France.

James Bushworth has been made secretary and general manager of the Aurora Tool Works Co., Aurora, Ind., succeeding Arthur C. Pletz, who resigned in order to establish himself in the machine tool specialty business in Cincinnati, O.

Abbott A. Thayer left New York on the steamer Bergensfjord recently for a business trip to Russia. Mr. Thayer is acting as a special representative for the Cincinnati Milling Machine Co. and other Cincinnati machine tool manufacturers.

Egbert Moxham, until recently associated with the E. I. du Pont de Nemours Powder Co., Wilmington, Del., as assistant manager of the development department, has accepted the position of general manager of the Aetna Explosives Co., New York.

William Disston, active head of the Henry Disston & Sons Co., Philadelphia, manufacturers of saws, is seriously ill in the German hospital, Philadelphia. Mr. Disston went south about a month ago, after an operation, but failed to show the expected improvement.

George F. Murphy is now associated with the Heine Safety Boiler Co., and will have charge of its sales offices at Pittsburgh, Pa. He was until recently sales representative in charge of the eastern branch office of Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, Mo., with headquarters in New York.

M. A. Sherritt, for several years associated with Manning, Maxwell & Moore, Inc., as manager of the Philadelphia branch, resigned his position to become vice president and general manager of Sherritt & Stoer Co., Inc., Finance building, Philadelphia, Pa., dealer in machine tools, railway and machine shop equipment.

Wm. H. Harman, who long has been prominently identified with the development of the hydraulic tool industry in the United States, has severed his connection with R. D. Wood & Co., Philadelphia, and has assumed charge of the hydraulic tool department of the Southwark Foundry & Machine Co., Philadelphia.

G. Burki, formerly with the E. L. Essley Machinery Co., Chicago, has acquired a financial interest in the Badger-Packard Machinery Co., Milwaukee, Wis., which deals in machinery, machinists' and mill supplies and transmission equipment. He is the vice president of the company and will have charge of the machinery end of the business. Mr. Burki served his time as an apprentice and has been superintendent of various establishments.

E. L. Leeds, since 1907 the manager of the railroad equipment department of the Niles-Bement-Pond Co., 111 Broadway, New York, has been appointed general manager of sales of that company and of the Pratt & Whitney Co., Hartford, Conn. Mr. Leeds succeeds W. L. Clark, formerly vice president in charge of sales of Niles-Bement-Pond and, B. M. W. Hansen, vice president of the Pratt & Whitney Co., who previously had been in charge of the Pratt & Whitney sales.

W. L. Kerlin, president, Boulevard Machine Co., New York, has returned from London, where he went a few weeks ago on business. He found the British war office thronged with agents who wanted to sell their goods to the government, many of whom have been waiting weeks for an interview with the proper official. A good part of the buying is done by the contractors to the government and Mr. Kerlin believes that American sellers can do as well with the commercial agent of the British government in New York, although his own trip was moderately successful.

On March 25, G. Mattman sailed for France on the steamer Patria. For a number of months past Mr. Mattman has been acting as a special representative of the Acme Machine Tool Co., the Bradford Machine Tool Co., the Cincinnati Bickford Tool Co., the Cincinnati Gear Cutting Machine Co., the Cincinnati Milling Machine Co., the Cincinnati Planer Co., all of Cincinnati, and the Cleveland Automatic Machine Co., Cleveland, with headquarters in New York City. He has been prominently identified with the negotiations accompanying the sale of large quantities of American machine tools to the belligerent powers of Europe.

War Demand Now Bigger Than Ever

Machine Tool Sales in March Run Into Millions and Prices Are Advanced Sharply—Purely Domestic Demand Growing Slowly

THE month of March again witnessed a tremendous volume of buying in the machine tool market. As in the preceding months, by far the greater part of this demand originated in war requirements; there were large bookings for export, as well as to domestic manufacturers who are working on war material contracts. The export demand, perhaps, was the most notable feature of the market, and single export orders were placed which for the amount of money involved eclipse anything previously known in the machinery market. Thus one concern secured, from a country which now is among the neutrals in Europe, a single order which involves an outlay extending into the millions. Another single order, placed with two concerns, embraced 277 small lathes and 89 turret lathes. Another order was for 100 knee type milling machines for Russia. Another single order was for 70 lathes. Export inquiries for lathes, involving single lots of 70, 75, 50 and less machines were quite common during the month. In addition, the demand for export involved large quantities of turret lathes, vertical milling machines, cold saws and cutting-off machines; there was also an active demand during the early part of the month for grinders and automatics for export. This export demand came principally from Russia, France, England, Spain, Sweden and Italy. In addition, there were some good bookings from Greece.

Among the principal buyers who closed for machine tools to make war materials was the Westinghouse Electric & Mfg. Co. This company closed two shrapnel contracts and made large purchases on account of each. The Bethlehem Steel Co. was also active, inquiring for 300 lathes and other kinds of machines in single lots of 20 to 50 of each kind. The E. W. Bliss Co., Brooklyn, N. Y.; the Pratt & Whitney Co., Hartford, Conn.; the Winchester Repeating Arms Co., New Haven, Conn.; the Remington Arms Co., Ilion, N. Y.; the Remington Arms Union Metallic Cartridge Co., Bridgeport, Conn., all bought heavily. The Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., bought 123 lathes and other equipment; the American Locomotive Co. bought some 500 machines, mostly turret lathes; the American Rolling Mill Co., Middletown, O., is buying heavily, and there were numerous other buyers during the month. Recent developments of this kind are recounted in the regular weekly machinery market review, published elsewhere in this issue. Among the concerns who figured on war contracts during the month, but have not yet closed, are the Crucible Steel Co. of America, Pittsburgh; the Barney & Smith Car Co., Dayton, O.; the Spicer Mfg. Co., Plainfield, N. J.; the Snead & Co. Iron Works, Jersey City, N. J.; the Schoen Steel Wheel Co., Pittsburgh; the A. P. Smith Mfg. Co., East Orange, N. J., and many others.

Deliveries are Delayed

THIS continued large demand for machine tools has made it still more difficult for the manufacturers to take orders for early delivery. In lathes the market is so well sold up that practically no manufacturer now is in a position to take orders for delivery prior to July 1. The situation in turret lathes also is similar, although such machines are not so well sold up as engine lathes. In vertical milling machines, certain sizes of automatics and cylindrical grinders, the manufacturers are extremely busy, in many cases working with day and night shifts; early deliveries, however, can be secured on nearly all lines of machine tools with the exception of lathes and turret lathes. As a rule, machine tool dealers have stocks of lathes or have made such provision that they are able to take care of the regular domestic demand without difficulty; in at least a few cases, however, the dealers are short on lathes. The recent big war demand, not only has caused war material manufacturers to extend their capacity, but has led to enlargements of manufacturing facilities at many machine tool plants. An illustration is found in the case of one large New England machine tool plant which booked sufficient business, both export and domestic, to keep it busy for five or six years. This concern practically doubled its capacity, and, in addition, was forced to sublet part of its work.

Buying for Ordinary Needs

DOMESTIC demand which has no connection with war requirements appears to have improved during the month. In Detroit, some of the automobile manufacturers have bought in a moderate way. In Chicago, there has been a fair amount of domestic buying and a number of companies are known to be on the point of entering the market for machine tool requirements. Features of this domestic demand were purchases of some $50,000 worth of machine tools by the Warner Gear Co., Muncie, Ind., rather large purchases by L. F. Shoemaker & Co., Pottstown, Pa., and fairly large inquiries by the National Tube Co. The most important railroad inquiries during the month were those issued by the Santa Fe and the Delaware, Lackawanna & Western. The Northwestern and the Burlington are known to have lists in preparation. Some fair crane business has been entered during the month, but on the whole crane builders are dull. Features of the crane market are an inquiry for a 150-ton ladle crane by the Central Iron & Steel Co., Harrisburg, Pa.; an inquiry in the hands of the department of commerce, Washington, for eight cranes for Portugese Africa; an inquiry for five steel works cranes by Corrigan, McKinney & Co., Cleveland, and the award by the Bethlehem Steel Co. of a 100-ton steel works crane to the Alliance Machine Co., Alliance, O. Other interesting features of the machinery market were the order placed by the General Electric Co. with Wm. Sellers & Co., Inc., Philadelphia, for a large slotter; the awarding of a 1,000-ton mixer contract by the Carnegie Steel Co. to the Pennsylvania Engineering Co., New Castle, Pa.; the purchase of two extremely large machines, a planer and a combination boring, milling and drilling machine, by the Toledo Machine & Tool Co., Toledo, O., and the purchase of a $20,000 Niles armor plate shear by the Midvale Steel Co. Manufacturers of machine tools have advanced their prices from 5 to 20 per cent on account of the heavy demand, as recounted in our regular weekly review published elsewhere in this issue.

Rapid Growth in Machinery Exports

Increase of 300 Per Cent in Metal-Working Machinery Exports in 17 Years—Europe Largest Customer—Trade With Other Continents Gains

BY E. C. KREUTZBERG

UNITED STATES custom house returns show an increase of more than 300 per cent in the exports of metal-working machinery during the past 17 years. In the year ending June 30, 1898, metal-working machinery exports had a value of $4,618,683. During the year ending June 30, 1914, this figure had grown to $14,011,359. The record year was 1912-1913, when these exports totaled $16,097,819. These figures, as well as those for the intervening years, are shown in Table I. Unfortunately, as the government does not classify the various kinds of metal-working machinery in detail, it is impossible to state the quantities of machine tools, steel works equipment, etc., that went to make up the totals for each year. The table begins with 1897-1898, which was the first year the government classified metal-working machinery separately.

Table I.

EXPORTS AND IMPORTS OF MACHINERY

Year ending June 30.	Exports metal working machinery only.	Imports all kinds of machinery.
1898.....	$4,618,683	$1,875,222
1899.....	6,491,586	1,630,542
1900.....	7,193,390	3,569,096
1901.....	4,054,313	3,324,765
1902.....	2,977,290	3,646,572
1903.....	2,826,111	4,085,825
1904.....	3,716,709	3,184,968
1905.....	4,332,665	2,943,300
1906.....	6,445,612	3,655,402
1907.....	9,369,056	4,963,429
1908.....	8,696,235	3,646,480
1909.....	3,640,034	4,258,743
1910.....	5,975,503	8,888,411
1911.....	9,626,965	7,575,659
1912.....	12,151,819	7,191,911
1913.....	16,097,288	7,497,103
1914.....	14,011,359	5,631,613

Table I also shows that imports of machinery during the same years showed a net increase of more than 300 per cent, having grown from $1,875,222 in 1897-1898, to $5,631,613 in 1913-1914. However, 1913-1914 showed considerable falling off from the four preceding years, and especially 1909-1910, the record year, when imports totaled $8,888,411. It must be borne in mind that these figures include imports of other classes of machinery as well as metal-working machinery, so it readily is apparent that this country has a large and growing balance on the export side of the ledger in metal-working machinery. That Europe always has been, by far, the largest buyer of American metal-working machinery, is shown graphically in Table II. Of our exports in 1897 and 1898, under this classification, 94.8 per cent went to Europe. Although exports to Europe in the year 1912-1913 showed an increase of nearly 300 per cent over 1897-1898, the percentage of the total exports that went to Europe had shrunk to 76.2 per cent. Over the 17 year period, exports of metal-working machinery to other North American countries had increased from $38,107 to $2,554,420; to South America, from $30,490 to $571,919; to Oceania (including Australia), from $11,969 to $468,472. The growth of exports to Asia and Africa was much less marked, those to Asia increasing from $139,593 to $196,769 over the 17-year period, and those to Africa from $15,683 to $37,031.

Table II.

METAL WORKING MACHINERY EXPORTS FOR REPRESENTATIVE YEARS, CLASSIFIED ACCORDING TO DESTINATION

	1912 1913.	1909-1910.	1906-1907.	1903-1904.	1900-1901.	1897-1898.
Europe	$12,268,677	$4,832,916	$8,423,471	$3,063,256	$3,728,806	$4,382,841
N. America.....	2,554,420	507,700	454,457	525,190	132,678	38,107
South America...	571,919	305,069	136,070	55,557	23,402	30,490
Asia	196,769	147,957	255,551	22,272	89,931	139,593
Oceania	468,472	162,557	90,990	23,525	67,407	11,969
Africa	37,031	19,304	8,517	26,909	12,089	15,683
	$16,097,288	$5,975,503	$9,369,056	$3,716,709	$4,054,313	$4,618,683

The tremendous growth in demand for American metal-working machinery by the principal countries of Europe is indicated in Table III. This table shows England and Germany always have been the largest single buyers of American metal-working machinery and that the exports to both countries for separate years were in nearly equal volume. Thus exports to each of these two countries have increased by about the same ratio. The table shows exports to France increased by more than 300 per cent, to Russia by more than 700 per cent, to Germany and England each by approximately 100 per cent.

Table III.

METAL WORKING MACHINERY EXPORTS TO PRINCIPAL EUROPEAN COUNTRIES, SHOWING DEVELOPMENT IN 15 YEARS

	1913.	1898.
France	$1,936,908	$ 577,165
Germany	3,175,188	1,669,828
Russia in Europe.	1,088,751	140,359
England	3,209,559	1,461,285

Huge War Order

The Crucible Steel Co. of America, Pittsburgh, is figuring on a war order which includes guns, munitions and various other supplies. In anticipation of securing this order the Crucible Steel Co. has 25 draftsmen at work preparing plans for large additions to be made at its Harrison, N. J., plant. These additions will cost $6,000,000 and it is planned to have them completed and the enlarged plant ready for operation within 90 days from the letting of the contracts.

To indicate the magnitude of the new additions that would be required if the company gets the contract, more than 100 cranes of various capacities will be required.

The Treadwell Engineering Co., Easton, Pa., is in the market for two cranes.

Tool Builders' Meeting

It is officially announced that the annual meeting of the National Machine Tool Builders' Association will be held at Atlantic City, N. J., May 20-21. Reports that have been in circulation to the effect that the meeting would be held at the Astor Hotel, New York, in April, are without foundation. The headquarters for the Atlantic City meeting will be at the Marlborough-Blenheim Hotel.

Credit Problems of Tool Builders

Would a Credit Bureau of the National Association Offer the Solution?—A Discussion of the Question by Cincinnati Manufacturers

THE National Machine Tool Builders' Association at its spring convention, May 20-21, probably will be called upon definitely to announce its decision relative to establishing a credit bureau. During the past few months, the advisability of this step has received the careful consideration of a number of tool builders. As a result, those who view the proposed bureau with approval are anxious for a decision by the national organization.

While the question is national in scope, the views which have been obtained by *The Iron Trade Review* from a majority of the builders in the Cincinnati district, may be fairly considered as representative. A personal investigation in that center served to reveal the wide variance in the opinions held by the machinery manufacturers, a variance that presages a close vote if the national organization is placed on record.

The Affirmative View

The affirmative side of the question was expressed in the following terms by a builder who manufactures shapers and milling machines:

"The credit bureau I have in mind would resemble in some respects those now maintained by the various organizations of harness, saddlery and leather manufacturers and lumbermen. In the lumber industry, for instance, there are several credit organizations which are distinct from the associations and whose work closely parallels that of the general commercial agencies. However, a dealer can secure credit information from the secretary of the associations that will give him a line upon his prospective customer without incurring any expense.

"The proposed bureau of the National Machine Tool Builders' Association would be an amplification of the latter idea. Builders from all parts of the country would be called upon to furnish credit information upon the various dealers who handled their tools. This information would include not only the customary details which can be readily secured from a commercial agency, but facts which have been ascertained through actual business transactions.

"For instance, in a certain town on the Pacific coast, there are two dealers. One of them, the older and more established firm, while on a sound financial basis, holds up its payments to manufacturers so that in effect, it operates upon their money. The head of this firm has told me personally that it had done as much as $250,000 worth of business in one year on an investment of its own of only $25,000.

"The second firm pays its bills promptly, but not being so well known, is not handling as large a volume of business as the first company.

"If the National Machine Tool Builders' Association maintained a credit bureau as a part of its organization, the situation as it exists in this city would be quickly corrected. One of two things would happen. Either the older dealer would be compelled to meet his competitor on a basis of equality by remitting promptly to the builders, or he would be driven out of business by the dissemination of information throughout the members of the national body as to the relative advantages of establishing commercial connections with the two firms.

"The same condition which I have just cited will also serve to show how this bureau would have a stabilizing effect upon the machine tool industry. A dealer who carries on his business along the lines pursued by the first firm can afford to offer better terms and lower prices than the second dealer, who is on a cash basis with the builders.

"In answer to the assertion that this information can be secured by getting in touch with other manufacturers when you desire to open a new agency, it is evident that in the case of two builders, their interests are more frequently divergent than overlapping. In other words, it will be only in rare instances that this particular second manufacturer can furnish you the information you desire on a dealer.

"With the national organization commissioned to receive and disseminate this information among its members, you receive the collective knowledge of a group of builders who through actual transactions are in a position to give you the information you desire."

The Negative View

Opposition to the plan results from the unwillingness of builders, who see little merit in the proposed bureau, to saddle onto the national association the expense entailed in establishing and maintaining such a bureau.

"We have never experienced difficulty," commented one builder of lathes, "when planning to establish a new commercial connection, in securing a good line on the dealer. Through other builders, whose tools he is handling, we can secure reliable information which supplements the work of the commercial credit agencies. If any builder cannot use this same practice to his own satisfaction, I would think there is something wrong with his own business, and he should not attempt to put onto the builders' association the burden of taking care of him."

"Through existing credit agencies, we are able to determine the fitness of any dealer who wants to handle our product," was the way another lathe manufacturer dismissed the idea.

Between the shaper manufacturer who was enthusiastic and the lathe manufacturer who was opposed, a wide range of opinions were expressed. The suggestion to create a credit bureau is comparatively new and manufacturers in increasing numbers are anxious to have the subject brought before the National Machine Tool Builders' Association.

Advance Lathe Prices

New York, March 31.—Practically all the lathe manufacturers of the country have advanced their list prices from 5 to 10 per cent. This movement originated with several manufacturers last week, and during the last few days nearly all the other lathemakers have followed suit. The establishment of higher list prices is due naturally to the great demand for lathes for turning out war materials. The higher prices, however, are no surprise to the trade since they have been foreshadowed by steps which were taken by lathemakers recently in cutting down some of the discounts usually granted. In a few cases, in fact, the makers have demanded, and received, full list prices. Incidentally, there is no disposition anywhere to criticise lathe manufacturers for these advances; in fact, it generally is considered surprising that the advances, in view of the tremendous demand for lathes, were not made sooner.

List prices on other machine tools remain unchanged in the east. It is expected, however, particularly now that the prices on lathes have been advanced, that similar advances will be made on one or two other lines.

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Good Reason for Demanding Guarantees

THE action of the Illinois Central and other railroads in placing orders for about 60,000 tons of steel rails with the Algoma Steel Corporation at a time when mills in the United States were badly in need of orders is vigorously defended by the *Railway Age Gazette*. Right in the beginning of its editorial, however, this able organ of the railroads says, "We believe that it would be a mistake for the railroads of the United States to adopt the practice of buying equipment and supplies abroad merely to secure the benefit of small differences in prices." That is exactly what was done when the recent purchases were made. C. F. Parker, vice president of the Illinois Central, in charge of purchases, stated emphatically that his company was guided *by considerations of price only* in purchasing 35,000 tons from the plant at the Soo. Officials of the Hocking Valley made a similar statement.

Later in its editorial, the *Railway Age Gazette*, after admitting that it is "desirable to have the price of rails table", says that there is a strong suspicion that by pursuing the policy they have, the steel companies have made larger profits in proportion out of rails than out of their other products. The fact is, however, that the average prices on plates, shapes and bars during the past 15 years have been higher than the price for standard steel rails. It is true, of course, that when the mills have rolled rails in accordance with extraordinary specifications of the Pennsylvania and other railroads, extra charges have been made. Our contemporary says that the railways of the United States "have been struggling for years with the railmakers to get them to make better rails". The truth is that both the railways and the railmakers have been doing all in their power to make better rails and have met with great success, at least on this side of the international line.

The most extraordinary part of the article of the *Railway Age Gazette* is that in which it holds up the Algoma concern as being superior to companies in the United States in methods of manufacturing. It says that the Algoma corporation agreed to make rails according to specifications which the American steel companies refused to accept and that the Algoma concern gave a five-year guarantee on its rails, which the mills in this country are not in the habit of doing.

What are the facts in regard to the quality of the products of the Algoma concern? The latest statistics available as to failures of rails are those contained in report No. 43 to the rail committee of the American Railway Engineering Association. No statistics as to Canadian mills are available for 1913. In 1912, the failures per 10,000 tons of open hearth rails were as follows: Algoma, 92.9; Bethlehem, 7.9; Cambria, 11.3; Carnegie, 8.3; Colorado, 13.2; Dominion, 319.0; Illinois, 5.1; Lackwanna, 3.3; Maryland, 7.6; Pennsylvania, 3.7; Tennessee, 5.5.

In view of this remarkable showing of failures by Canadian mills, it is not at all surprising that the recent purchasers of rails exacted some rigorous guarantees from the Canadian makers.

Again the Question of Ships

ONE of the principal difficulties which machine tool manufacturers recently have encountered in taking care of the large export demand for their products is the acute situation in ocean transportation due to the war and the almost total lack of American ships. With a great many of the passenger and cargo vessels interned, and with others withdrawn from their regular routes in order to transport troops and supplies from Great Britain to the continent, shipping facilities across the Atlantic are at a premium. Following are examples of how ocean freight rates to British and European ports have been affected. The rate, based on weight or measurement to Liverpool before the war was $4.25 per ton on machinery of ordinary size; last Saturday this rate as quoted to shippers had jumped to $18.20 per ton. The package rate to Glasgow before the war ranged from $4.85 to $11 per ton, while last week this

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rate had been increased to $24 per ton; this new rate applies to all shipments, no attention being paid to the usual weight classifications. Before the war, the rate on machinery of ordinary size to Havre was $5 a ton, and that to Bordeaux $6 a ton, while at the time of the last sailing the rates had been increased to $20 for Havre and $21 for Bordeaux. Rates to other ports have been advanced in proportion. Glasgow is the only port, however, to which the usual package differentials no longer apply.

As to insurance on ocean consignments, the ordinary marine insurance remains at the same rates as before. Since the outbreak of the war, however, shippers have had to go to the trouble of covering their goods with war insurance. An interesting feature of this war insurance is that it now costs less than immediately after the war started. At that time, the rate generally was 2 per cent ad valorem. This rate gradually went down until by November it was 0.25 per cent. When Germany, however, announced its famous war zone declaration, the rate again advanced and now averages about 1 per cent ad valorem. Incidentally the war insurance rates above mentioned are those quoted by English insurance companies; the American companies right along have averaged about 0.25 per cent higher than the British companies. The explanation undoubtedly is that the English companies naturally have been under the necessity of meeting the rates offered by the bureau of war risks of the British government. Incidentally, while the British government has insured a great many machinery cargoes, it is impossible to find a single instance where an American machinery manufacturer took advantage of the war rates offered by the government at Washington. This, naturally, is due to the lack of American boats to Europe, since the two governments offer insurance only on cargoes sailing under their respective flags.

The high freight rates naturally are due to the more infrequent sailings, although it is interesting to note that vessels to France are about as numerous as formerly. Making shipments to France, however, is rendered somewhat more troublesome through having to apply to the French consul in New York for reservations. This restrictive feature is even more pronounced in making shipments to Rotterdam, since the Dutch boats will take goods only when they are consigned to the Netherlands government direct, or to the Netherlands Trust Co. The vessels to England are more free as to the goods they will take; the chief difficulty here is that where a shipper formerly had about three opportunities to ship to England, he now has one. Vessels to Italy sail on practically the same schedule as formerly, but it is more difficult to get space in them on account of heavier shipments. Shipping to other Mediterranean countries has been more difficult, one shipper, for instance, after attempting for two months, has just succeeded in getting a machine tool consignment off to Greece. Shippers so far have had little difficulty in getting space to Norway, Sweden and Denmark, and shipments to Spain have gone through promptly. Indications, however, point to a larger movement in the exports to the Scandinavian countries and to Spain, and it therefore is likely that cargo space to these destinations will be more limited in the near future.

And most all of this trouble could have been avoided if in years past a succession of senseless congresses had not steadfastly refused to listen to sane advice in regard to upbuilding the American merchant marine.

Canada has raised the duty on machine tool imports from 27½ per cent to 35 per cent ad valorem. Why? Because in Canada, as in the United States, the demand for ammunition and other munitions of war has resulted in tremendous purchases of machine tools and the Dominion government wishes to make it certain that as many of these tools will be furnished by Canadian manufacturers as possible. It is significant, also, that there has been no tariff agitation in Canada. Conditions simply were ripe for an additional duty and it was at once put into effect. We in this country still have a few things to learn from our cousins across the border in quick, businesslike way of doing for the public.

Prices Present and Past

Quotations on leading products March 31, average for March, 1915, average for January, 1915, and average for April, 1914. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Mar. 31.	Average for Mar., 1915.	Average for Jan., 1915.	Average for Apr. 1914.
Bessemer pig iron, Pittsburgh..	$14.55	$14.55	$14.70	$14.90
Basic pig iron, Pittsburgh.....	13.45	13.45	13.45	13.90
No. 2 Fdy. pig iron, Pittsburgh	13.80	13.80	13.70	14.15
Northern No. 2 Fdy., Chgo....	13.00	13.00	13.00	14.25
Lake Superior Charcoal, Chgo..	15.75	15.75	15.75	15.50
Malleable, Bessemer, Chgo.....	13.00	13.00	13.00	14.25
Southern No. 2, Birmingham...	9.50	9.50	9.50	10.50
Southern Ohio No. 2, Ironton..	12.75	12.75	12.75	13.50
Basic, eastern Pa.....	14.00	14.00	13.50	14.25
No. 2X Virginia furnace.....	12.50	12.50	12.50	12.75
No. 2X Foundry, Philadelphia..	14.50	14.25	14.25	15.00
Ferro mang. Balti. (prompt)...	100.00	100.00	68.00*	38.00
Billets, Pbgh.....	20.00	19.50	19.50	20.80
Sheet bars, Pbgh.....	19.00	20.00	20.00	21.60
Steel bars, Chicago.....	1.34	1.34	1.29	1.33
Steel bars, Pittsburgh.....	1.15	1.10	1.10	1.15
Iron bars, Philadelphia.....	1.125	1.125	1.12	1.22
Iron bars, Cleveland, local del'y.	1.25	1.15	1.15	1.20
Iron bars, Chgo. mill.....	1.15	1.10	0.98	1.15

*Nominal

	Prices Mar. 31.	Average for Mar., 1915.	Average for Jan., 1915.	Average for Apr. 1914.
Beams, Chicago	$1.34	$1.34	$1.29	$1.35
Beams, Pittsburgh	1.15	1.15	1.10	1.18
Beams, Philadelphia.....	1.259	1.25	1.25	1.30
Tank plates, Pittsburgh.....	1.10	1.125	1.10	1.15
Tank plates, Chicago.....	1.29	1.34	1.29	1.32
Tank plates, Philadelphia.....	1.259	1.25	1.25	1.30
Sheets, blk., No. 28, Pittsburgh	1.80	1.80	1.80	1.92
Sheets, blue an., No. 10, Pbgh..	1.30	1.30	1.30	1.40
Sheets, galv., No. 28, Pbgh.....	3.40	3.40	2.77	2.92
Wire nails, Pittsburgh.....	1.60	1.60	1.51	1.60
Connellsville fur. coke contr....	1.65	1.65	1.69	2.00
Connellsville fdy. coke, contr....	2.25	2.25	2.25	2.50
Heavy melting steel, Pbgh.....	12.00	12.00	11.55	12.00
Heavy melting steel, east'n Pa.	11.50	10.50	9.50	11.50
Heavy melting steel, Chgo.....	9.75	9.75	8.87	9.50
No. 1 wrought eastern Pa.....	12.50	12.00	11.50	13.00
No. 1 wrought, Chgo.....	9.00	9.00	8.80	8.50
Rerolling rails, Chgo.....	10.00	10.00	9.50	11.25
Car wheels, Chgo.....	10.00	10.00	10.00	11.00

(For Additional Prices See Page 696.)

Quiet Follows Heavy Buffalo Selling

Large Number of Orders Placed in Recent Movement, Aggregating 300,000 Tons—Melters in Other Districts Seek Low Quotations, But Encounter Some Firmness

New York, March 30.—With the sweeping selling movement of iron in eastern territory by Buffalo furnaces now having subsided so that only comparatively small or odd lots are being gathered in, there is reliable information available that the bookings entered during this drive, total about 300,000 tons of all grades. More than half of this tonnage is understood to have gone to one seller who was early in the field with the lower prices. Most of the sales made were of the 1,000 to 5,000-ton class, with at least one lot of 10,000 to a Massachusetts buyer, previously reported and one of larger tonnage. It is understood the great bulk of the sales was put through in a comparatively few hours' time after the furnaces had determined upon an aggressive campaign and the long distance telephone furnished the method whereby the swift closing of the business was made possible with a minimum of information leaking out to competitors. By late last week, most of the desired business had been secured by the more active sellers and two of these withdrew their low prices and advanced to $12.50, furnace, for second quarter and to $13 for last half. These sellers now are holding firm at these levels and have made small sales on this basis. Other sellers in the Buffalo district who were slower to get into the movement are retiring the low prices more deliberately, but the inclination is back toward a $12.50, furnace, level, if this already has not been reached. The lowest prices brought out by the campaign were $11.50, Buffalo furnace. A radiator company in the Buffalo district took some tonnage at this figure and other sales are reported, but such transaction were few. It is learned, however, that one seller near the Buffalo district and with about a 50-cent freight advantage to the east over the latter, closed considerable tonnage in New York state and in New England at $12, furnace, or practically $11.50, Buffalo basis. The large purchase of a Massachusetts textile machinery builder is believed to have gone to this seller. Considerable tonnage was sold at $11.75 and $11.90, Buffalo, but most of the iron in the movement brought $12 or better. Since the low Buffalo prices have been disappearing, the market has quieted down greatly and little now is being done. The Lackawanna railroad inquiry for 4,000 tons, which was still open last week, finally has gone to Buffalo makers. The 1,250-ton order for Harrison, N. J., of the International Steam Pump Co., has been closed. A Reading, Pa., radiator manufacturer bought 500 tons. Several Connecticut consumers closed for 1,000 to 2,000 tons each just before the withdrawal of the lower Buffalo schedules. Makers in eastern Pennsylvania, central Pennsylvania and other eastern territory, who were practically forced out of competition by the low Buffalo prices, now are booking a modest tonnage in this and surrounding districts.

Prices Up—Sales 300,000 Tons

Buffalo, March 30.—Over 400 melters placed their orders for pig iron during the Buffalo drive, lasting about 10 days, and now rolling up a total of fully, if not slightly in excess of, 300,000 tons booked.

As the orders came towards the end of last week, many from foundries unsolicited in the sales raid of New England and the rest of the eastern territory, furnace interests began to stiffen on prices quoted. Two of the leading producers announced $12.50 for second quarter on No. 2X as their minimum and $13 for third quarter deliveries. The third large producer did not follow until late on Monday. The last interest to come in on the advance in prices from the $11.50-

(*For complete prices see page* 696.)

$11.75 and $12 levels reached during the raid now announces that its flat minimum on any grade is $12.50 for second quarter delivery and may decide at an early date to quote nothing less than $13.

The great bulk of the tonnage placed was in foundry grades. Melters engaged in the railroad supply lines took little part in the movement, as only a small tonnage of malleable was placed. In basic, about 12,000 tons were booked. One order for the latter totaled 7,500 tons, another 2,500 tons and several for 500 to 1,000 tons, the price on the basic being $12.75 to as high as $13 at the furnace.

So far, the advance in prices announced has acted practically as a stop-sales schedule. Only a single order for 200 to 250 tons of foundry iron being booked since the drive ended at $12.50. The interesting point in connection with this sale was that the iron goes to a competitive point.

With orders enough on hand to keep 10 of the 12 merchant stacks of the district going full blast for three to four months, the producers have withdrawn further active interest in the selling of iron of any grade, even at the advanced prices.

The amount of business that was uncovered by the shaving of prices came as a surprise to the interests of the Buffalo district involved and is considered a sign that general conditions are much more satisfactory than had been generally supposed.

Looking for Low Prices

Cleveland, March 30.—As was expected, the selling of pig iron by Buffalo furnaces in large quantities at from $11.50 to $12, furnace, has had the effect of deferring buying from furnaces at other lake points. Foundries have been looking for as low prices as the lowest made at Buffalo, but have not found them and the result is that there is almost no buying. Some weakness has, however, developed and while $13, furnace for No. 2 is apparently the lowest quotation for delivery to Cleveland melters, $12.50, furnace, has been shaded for shipment outside of the city, and it is reported that as low as $12.25, furnace, has been done. The lowest valley quotation seems to be $12.50 for No. 2 foundry.

Pipe Makers Buy Southern

Philadelphia, March 30.—Following the low priced drive of Buffalo makers which overlapped into this territory and gathered in lots of foundry and malleable, totaling perhaps 10,000 tons, the market in this district has remained quiet, speaking generally. Pipe makers have been more active in buying low grade iron, principally southern, for delivery in this and outside territory. Some of these buyers have made strong efforts to develop a $9.25, Birmingham basis, for No. 2 for forward shipment, and it has not been possible to state how far they have succeeded. It is known, however, as stated last week, that certain leading southern furnaces had declined to accept good tonnages offered at the $9.25 figure. The United States Cast Iron Pipe & Foundry Co. has been negotiating for 20,000 to 30,000 tons of southern for several plants and has closed for some tonnages. At least a part of this is for delivery to Burlington, N. J., and other northern plants. One of the Lynchburg, Va., pipe works has taken 5,000 to 10,000 tons for last half and is reported to have paid $9.50, Birmingham basis, for No. 2. As previously reported, mottled iron recently has been offered at $8.25, Birmingham, or $12.45, delivered along the Delaware river. Makers of foundry iron in this territory continue to quote around $14.50, Philadelphia, for No. 2X, or $13.75 to $14 at the furnace. A Philadelphia buyer closed for 1,000 tons of No. 2 plain at a reported low price. Virginia iron continues to sell at $12.50, furnace, for No. 2X for second quarter and last half. Steel-making irons remain inactive. Small sales of low phosphorus are being made at the prices recently prevailing. A Cumberland, Md., buyer who asked 500 tons of prompt basic has closed with valley makers, at less than $13.75, delivered. There is no demand for basic from eastern Pennsylvania consumers and the price nominally is $14, delivered.

La Follette Blown In

Cincinnati, March 30.—Sales and inquiries in the Cincinnati district continue very light and scattered, but some good business has been done in surrounding territories. Michigan melters have taken 1,100 tons of silvery iron, 1,300 tons of malleable iron and 3,600 tons of foundry iron, mostly for last half delivery. A central-southern Ohio manufacturer has purchased 500 tons of southern foundry iron, this being the only transaction of importance in this vicinity in the past few days. The majority of small sales are being secured by solicitation and not from general inquiries. It is the general opinion here that first half buying has been about completed, and that transactions in the future will be limited mostly to second half business. A little resale iron has been sold at $9.25, Birmingham basis, for No. 2 foundry, for prompt delivery. Furnaces in both Tennessee and Alabama are quoting from $9.50 to $9.75, Birmingham basis, for No. 2 foundry. The La Follette furnace, which has been banked, will blow in the latter part of this week. Southern Ohio No. 2 foundry is given at from $12.75 to $13, Ironton basis.

(*For complete prices see page 696.*)

At Low Ebb.

St. Louis, March 30.—The pig iron market is at a low ebb in the St. Louis territory, inquiries and sales being limited to a few car lots. The prospects for an early improvement do not appear to be bright. Southern No. 2 is held at $9.50 to $10, Birmingham. Northern iron, which is even less in demand than southern, is quoted at $13 to $13.50, Chicago, and $13.50, Ironton. The freight rate on southern iron is $3.40 to St. Louis.

Will Hold to Prices

Birmingham, Ala., March 29.—No developments of any consequence occurred the past week in the Birmingham pig iron market. Local iron interests expect a falling off in inquiry and business following the large sales in the Buffalo district last week, but state that they will make no reductions in quotations. An offer of $9.25, it is understood, was refused by a local maker last week on 10,000 tons No. 2 foundry. Quotations still are maintained at $9.50 to $9.75, Birmingham.

Market in Waiting State

Chicago, March 30.—Buyers of pig iron in this territory are not much interested in the market at present and no ripple from the splash in Buffalo last week has been discerned here except that some melters have thought a similar occurrence might bring about a reduction in prices to the same degree as took place at Buffalo. However, it is a fact that under normal conditions Buffalo iron usually is held about $1 per ton lower than Chicago iron and therefore the dip of prices in the east to $12 was simply to gain a low level practically equivalent to the $13 quoted for iron at Chicago furnaces.

Another condition which is quite different from that in the Buffalo field is that only 25 per cent of merchant capacity is now active here, whereas at Buffalo almost the entire merchant capacity is in blast and the tonnage to be disposed of is correspondingly large.

Comparatively little inquiry is evident here, the largest item being a request from an Illinois maker of agricultural supplies for prices on 500 tons of northern and 500 tons of southern foundry iron, accompanied by assurance that the inquirer has

sufficient iron for the present year, but will buy for last half delivery if prices are attractive.

A Michigan maker of automobile castings is in the market for 300 tons of 8 to 9 per cent silicon.

Northern makers have not receded from their position, asking $13 for northern No. 2 foundry and malleable with 50 cents advance for third quarter and general refusal to bid on last half.

Southern iron is equally quiet with quotations from $9.50 to $10, Birmingham, for No. 2 foundry, and little interest is manifested by melters.

Buffalo Iron For Pittsburgh.

Pittsburgh, March 30.—Approximately 2,000 tons of Buffalo pig iron for shipment the remainder of the year was sold in this district last week, but the valley market showed no effects of the invasion. Buffalo tonnage involved in sales in this locality is understood to have commanded $12, furnace, for No. 2X. Valley makers are asking $13 and above at the furnace for foundry and malleable grades, although an attractive inquiry might develop slightly lower prices. Steel making grades show no change in position. As previously reported, a valley interest has shipped about 1,000 tons to Italy. Additional tonnages for similar shipment have been engaged, but the importance of such transactions is minimized because of the extreme difficulty of obtaining shipping space in vessels.

Recent Buying of Scrap

Of Heavy Melting Grade Helps Old Material Market in the East—Market Weak at Chicago

Philadelphia, March 30. — Recent orders for heavy melting steel at $11.50, delivered eastern Pennsylvania, which now it is understood aggregated 10,000 to 15,000 tons, continue to give the market in this and other grades of old material a firm and stronger appearance. Most of the steel was taken by one eastern Pennsylvania works. There is some talk that higher than $11.50, delivered, has been paid in isolated cases. Brokers are bidding actively for material against those orders paying $11.25 and $11.30 and higher at the certain mill points. Several of the other large buyers of heavy steel in eastern Pennsylvania, however, are not willing to pay over $11, delivered, in view of present prices for finished material and are inclined to expect a reaction of the market. Certain steel works have been taking in forge fire scrap, and this has put up the market in that grade. Further sales of turnings have been made at $8.75, delivered. One buyer is offering $7.25, delivered, for blast furnace borings. Shafting is strong and $15, delivered, is freely offered.

Reaction in New York

New York, March 30.—Some reaction from the recent advancing tendency of the old material market in this territory has appeared during the past few days and the tone is considerably easier. There has been no new buying of heavy melting steel for eastern Pennsylvania deliveries since the recent orders at $11.50, delivered, and the mills now are offering only about $11, delivered. The brokers are bidding less actively for steel, either for eastern Pennsylvania or Pittsburgh delivery. Easier reports regarding the market also are coming from the latter district. Heavy steel at New York, while there are few sales, probably holds around $9. Recent lower prices on pig iron by Buffalo furnaces appear to have influenced the foundries to seek lower prices on scrap. Some traders feel that the present lull and easiness will be only temporary. A 1,600-ton steel bridge at Atlantic avenue, Boston, recently has been bid upon by dealers.

Pittsburgh Scrap Quiet

Pittsburgh, March 30.—The Pennsylvania railroad is offering about 15,000 tons of miscellaneous grades of scrap in one of the largest lists circulated in this district for many months. Dealers describe the market as dull, and no trace of large sales can be found. Heavy melting steel is listed at a spread from $12 to $12.50, delivered, but quotations have not been severely tested the last fortnight.

Weak at Cleveland

Cleveland, March 31.—Reflecting the sacrifice sales of Buffalo pig iron, the iron and steel scrap market has shown considerable weakness in the past week. Foundry demand for cast scrap, which has been fair for several months, took a sudden slump, and prices have dropped 25c to $10 to $10.25 a ton. Heavy melting steel also has been effected, both in this district and in the valleys, and is quoted today at $10 to $10.25, gross ton, delivered mill, Cleveland, and $11.25, delivered valley mills.

All the Cleveland rolling mills are holding up shipments, while the heavy steel consumers are in about the same position.

Buffalo Dealers Active

Buffalo, March 30.—More interest in the old material market has developed in the past week than has been noted in some time. The activity reported a week ago has materially increased. The leading local consumer of heavy melting steel has come in for some good tonnages of this line and other orders have been booked with users outside of the territory, principally in the Pittsburgh and valley districts.

The number of sales made have had no bearing as yet on the price situation. Yards seem to have large stocks of practically all lines to be disposed of and coupled with this have assumed an attitude of willingness to sell. This situation acts as an offset to any price advances for the present.

Some of the dealers are beginning to feel that better prices may be looked for, but so far schedules remain the same as previously quoted.

Scrap Metal Weak

Chicago, March 30.—Continued weakness and lack of trading mark the scrap iron and steel market in Chicago, with slight declines in a number of items. Large users are not yet ready to add to their holdings, as they bought liberally a short time ago, and conditions have not made it possible to enter the market again. With lack of demand, dealers find no outlet for their accumulations and railroads continue to offer considerable tonnages, which are a further burden on the market.

The Grand Trunk has a list before the trade offering 1,900 tons, the North-Western 7,200 tons, which includes 1,500 tons of long steel rails, Rock Island 3,500 tons, including 800 tons of long steel rails, and the Soo line 800 tons.

No Railroad Lists

St. Louis, March 30.—No scrap lists from the railroads are out this week, and prices are unchanged from those quoted last week. Buying has been limited, as the mills appear to have a considerable tonnage of melting steel on hand, and are not anxious to enter the market.

Melting Steel Strong

Cincinnati, March 30.—The fact that the plants of the Andrews Steel Co.,

(*For complete prices see page* 696.)

Newport, Ky., and the American Rolling Mill Co., Middletown, O., are now running full in all departments, has given new life to the scrap market, as these are among the largest consumers of old materials in this territory. Heavy melting steel is especially strong, and while the quotation of from $9 to $9.50 per gross ton is unchanged, the tendency is to advance. Jobbing foundries are fairly busy, mostly on machine tool castings, but they are buying principally in small lots from time to time. A general report of dealers shows that heavy melting steel, cast borings, No. 1 machine cast, No. 1 busheling, and bundled sheet scrap, are the best sellers. No changes in prices are reported.

More Specifying of Bars

As the First Quarter Closed—Prices Stronger Than on Plates or Shapes

Chicago, March 30.—Steel bars are the strongest item in the finished steel market and business during March gives promises of running 50 to 60 per cent better than during February on both orders and specifications. During the past week, nearly all sellers have noticed that specifications were received in increasing volume while new business was somewhat quieter. All sorts of users of steel bars have been specifying on their contracts, without any particular department showing unusual activity.

Sellers of finished steel express themselves as determined to hold quotations at 1.39c, Chicago mill, for second quarter, in the belief that no greater tonnage would be called out by a price lower than this. Large users of finished steel contracted for their probable requirements early in the year at 1.29c and 1.34c, Chicago mill, and it is questionable how large a tonnage of new business will be available for second quarter.

Specifications Are Stimulated

Philadelphia, March 30. — Closing days of the first quarter and the advanced price of 1.20c, Pittsburgh, for second quarter, have stimulated considerable specifying against old contracts for steel bars in this territory, which largely are of the 1.10c, Pittsburgh class. Mill orders of this character have been in good tonnage the last week. Some additional new buying of March bars at 1.15c, Pittsburgh, or 1.309c, Philadelphia, has been done and this price seems firm. These lots usually have been small. No contracts at 1.20c for second quarter yet are announced by sellers. It is apparent that a number of consumers have been covered through the first half. The Cumberland Valley railroad, which has awarded the general contract to the Robert Grace Contracting Co., Pittsburgh, for a large concrete bridge at Harrisburg, is inquiring for 410 tons of square and twisted bars for reinforcing, which are a part of the requirements of this work. Other small inquiries for reinforcing bars are numerous.

Bars Stronger Than Plates or Shapes

Pittsburgh, March 30.—Steel bars seem stronger than either plates or shapes and makers probably will experience less difficulty in establishing the bar market at 1.20c than either that for plates or shapes. Demand is described as satisfactory, and some material has been sold at 1.20c for second quarter delivery. Agricultural implement makers are beginning to show interest in the market, and probably will buy more material than they engaged a year ago. Bar iron is quiet and prices are untested.

Heavy Inquiry for Rounds

Cleveland, March 30. — Inquiries for rounds for use in the manufacture of shrapnel, making a large tonnage, are pending in the Cleveland district, following the recent placing of contracts for about 3,000 tons. The largest inquiry pending is for 49,000 tons for the French government and two others aggregate 5,000 tons. This business is not attractive to most mills in the central west. The steel bar market is firm at 1.15c and confidence is expressed that no difficulty will be experienced in putting into effect the 1.20c, Pittsburgh, price April 1.

Closes Shell Contract

New York, March 30.—Several large negotiations for steel rounds for shrapnel manufacture, both with manufacturers here who have contracts and with the warring governments direct, are going forward in this territory. Some further large sales are expected to be closed shortly. The American Locomotive Co. has closed a contract for several million shrapnel shells for the allies, to be furnished over a term of months which it is estimated will require 20,000 to 25,000 tons of steel rounds for this order. A direct inquiry from the French government for 135,000 tons of steel rounds, previously referred to, remains in the market. Several large inquiries for forgings for shrapnel and lydite shells also are under negotiation. One of these from an Ohio manufacturer calls for 5,000 to 6,000 tons. Prompt steel bars have continued to manifest firmness at 1.15c, Pittsburgh, and some important buyers who were holding off for lower figures, came in the past week on this basis. Makers now are quoting second quarter bars at 1.359c, New York, or 1.20c, Pittsburgh.

Prices Firm at Buffalo

Buffalo, March 30.—The price slashing raid of the Buffalo furnaces for pig iron orders in the eastern territory developed no sympathetic signs of a sag in quotations on the part of the mills and agencies of the district. Prices of 1.15c, base, on bars, shapes and plates previously quoted on March deliveries, pass from the market March 31, giving way to the price of 1.20c being asked on second quarter deliveries, but not promised to hold beyond the month of April.

Notices sent out recently regarding the advance at hand have caused a noticeable increase in the activity for the latter part of the month, particularly in the volume of specifying in order to get out full quotas before the 1.20c figures go into effect.

Bar Iron is Quiet

Chicago, March 30.—Bar iron continues to be quiet, with somewhat lessened demand, but no reduction in price. Quotations are steady at 1.15c, Chicago mill, without shading and no sign is apparent of any imminent change. Local mills are operating about as usual, none being on full time and demand not being quite equal to shipments.

Hoops, Bands, Shafting

Pittsburgh, March 30.—Specifications for hoops and bands in March are described as fairly satisfactory, involving slightly heavier tonnages than those received in February. Bands will be advanced to 1.20c for second quarter shipment. Hoops are listed at 1.20c, but that figure is untested. Cold rolled shafting is being held at a range from 69 to 70 per cent off list.

The Gibb Instrument Co., Highland building, Pittsburgh, has been appointed agent for the Beighlee Electric Co., Cleveland, manufacturer of pyrometers. The Gibb company will represent the Electric company in the Pittsburgh district.

(*For complete prices see page 696.*)

Last Referendum Carried

By Workers Favoring Acceptance of Reduction in Wages at Sheet and Tin Plate Mills

Pittsburgh, March 30.—Sheet and tin plate mill divisions of the Amalgamated Association of Iron, Steel and Tin Workers last Saturday voted to accept revised wage schedules providing reductions of about 11.2 per cent for sheet mill and 6 per cent for tin plate mill men. Revised schedules had been turned down by rather large majorities at two previous referendum elections. Two lodges, connected with the plant of Follansbee Bros., Follansbee, W. Va., and the Wheeling plant of the Whitaker-Glessner Co., Wheeling, W. Va., refused to participate in the third election, and some talk of secession is heard. Men at the Martins Ferry plant of the Whitaker-Glessner Co. rejected the revised scale by a vote of 156 to 2. Men at plants owned by the American Rolling Mill Co., the National Enameling & Stamping Co., the Brier Hill Steel Co., the Youngstown Iron & Steel Co., and the DeForest Sheet & Tin Plate Co. favored cuts by a total vote of 945 to 264. Reports from mill centers indicate that plants resumed work either Sunday or Monday. Unless a revolt occurs in the Amalgamated Association, the wage question will not be seriously considered again until the latter part of May, when the association holds its convention at Louisville, Ky.

Mills not affected by labor troubles enjoyed good demand this month, and several interests received heavier specifications than in any month for more than a year. Moderate demand for export is reported, but no large contracts have been placed. The American Sheet & Tin Plate Co. is operating sheet mills at 68 per cent of capacity.

Orders Less in East

Philadelphia, March 30. — Some falling off from the recent volume of orders for sheets has been noted by eastern Pennsylvania makers and operations have declined slightly. In price the market seems to hold at a minimum of 1.459c, Philadelphia, or 1.30c, Pittsburgh, for No. 10 gage blue annealed, on the highly competitive orders, but $1 or more a ton higher is frequently obtained on miscellaneous business. It develops that the advance to 55 cents per 100 pounds in water freights to the Pacific coast by way of the Panama canal applies only to sheet mill products. Pacific coast buyers are expecting a reduction in the water rates when the new trans-continental tariff is announced by the railroads and hence continue to postpone action.

Slight Concession

Cleveland, March 30.—For the first time in several weeks, the sellers of galvanized sheets are showing some disposition to recede from the recent highest quotations and 3.30c, Youngstown, can now be done on desirable business. The demand for galvanized as well as for blue annealed and black is not very active.

Rolling Mills Resume

Cincinnati, March 30.—The Newport Rolling Mill Co., Newport, Ky., has resumed operations in all departments, as has also the Andrews Steel Co., of the same address. The American Rolling Mill Co., Middletown, O., and the Portsmouth Steel Co., Portsmouth, O., are also operating in full, the former having recently received heavy orders for forging billets and sheet bars. Sales are good, and are mostly for prompt deliveries, as mills will not quote very far head, and prices are subject to change from day to day. Books have now been opened by the mills for second quarter business. Black sheets No. 28 gage are quoted at from 1.85c to 1.90c, and galvanized No. 28 gage at from 3.40c to 3.45c, both Pittsburgh basis.

Sheet Market Nominal

Chicago, March 30.—The situation in galvanized sheets is unchanged, a nominal quotation of 3.69c, Chicago mill, standing in most cases with buyers slow to close and sellers unwilling to take additional tonnage. Until the spelter market clears, business in galvanized sheets probably will continue at a minimum. Warehousemen have not advanced their prices materially, but even under these circumstances find the demand for galvanized sheets almost negligible.

Blue annealed and black sheets are sluggish, with quotations unchanged.

Tin Plate For Export

Pittsburgh, March 30.—The American Sheet & Tin Plate Co. has received a duplicate order for about 75,000 boxes of tin plate for shipment to the far east, making the total order involve about 7,000 tons of material. Several other orders, involving smaller tonnages, have been received for export. Tin plate plants are operating at just about maximum capacities. The American Sheet & Tin Plate Co. continues to drive its mills at 95 per cent of capacity.

(*For complete prices see page* 696.)

Wire Mills

Are Busy—Advance in Extras on Galvanized Not Established

Pittsburgh, March 30.—Western Pennsylvania and eastern Ohio wire mills continue to enjoy activity. Inquiries for export involve 50,000 tons, according to some estimates, and several attractive orders for foreign shipment were placed this week. Domestic demand reflects moderate improvement, but there is no new buying of consequence and the $1.60 price for nails has not been tested. Advanced extras for galvanizing are being quoted by some makers, but they have not been firmly established.

Adheres to Advance

Cleveland, March 30.—The American Steel & Wire Co. adheres to the recent advance on extras on galvanized wire, although some independent companies have not made the last advance. It seems probable that the higher extras will be maintained, unless the price of spelter recedes. The test will come soon when numerous contracts for galvanized wire will expire.

Warehouse Business Improves

Chicago, March 30.—Approach of spring and the building season has quickened demand for warehouse products and everything in the line of structurals and other building materials is being moved at an increasing rate. Warehouses apparently have a large tonnage of galvanized sheets and have not advanced their quotations materially on this variety, as users have not evinced much interest in this product.

Prices Strong

Cincinnati, March 30.—Warehouse business is good, and prices have stiffened. Demand has improved for twisted reinforcing bars and structurals, as building operations are now well under way. Sales of all other materials carried by dealers here are also good. Steel bars are now quoted at from 1.75c to 1.80c, iron bars at from 1.70c to 1.80c, shapes and plates at from 1.85c to 1.90c, and blue annealed sheets No. 10 gage, at 2c, all Cincinnati basis.

Ship Plates for Export

Orders Still Coming From England—Sharp Competition on Domestic Business Brings Out Low Quotations

Philadelphia, March 30.—Further orders for steel plates are being directed to eastern Pennsylvania mills for export to the British Isles as the result of higher offers being made by buyers of the latter country. Another lot of 550 tons of ship plates practically has been booked by an eastern Pennsylvania maker at about 1.25c, tidewater, or better than 1.14c, Pittsburgh, and other lots are under negotiation. The usual method of sale is on a tidewater basis, the freight being to the account of the buyer. This is favorable to the mills, since it spares them from engaging vessel room at the high market that continues to prevail. In connection with the high price for ship plates in Great Britain, now about $44, delivered, it is to be noted that this applies to gross tons. Eastern plate mills are not increasing their operations, as large orders are few and schedules are made up chiefly of small and moderate sized lots. Some of these plants, however, have gotten up to 75 per cent of capacity. Others are doing 60 to 65 per cent. Eastern makers will furnish about 300 tons of plates to the Harlan & Hollingsworth Corporation for 30 coaches ordered by the Central Railroad of New Jersey. Prices on ordinary quantities run from 1.10c to 1.15c, Pittsburgh, or 1.309c to 1.349c, Philadelphia. On attractive tonnages and where the extras have been considerable, the minimum figure has been cut sharply. An asking price of 1.20c, Pittsburgh, for second quarter contracts now is being instituted.

Pittsburgh Plates Advance

Pittsburgh, March 30.—More prominent plate makers will advance prices $1 a ton tomorrow night, and will quote 1.20c for shipment after March 31. Irregularity the last few days, however, leads to the belief the market will not respond immediately to the advanced quotations. Material has been offered at 1.10c by certain mills in the east and central west, and reports of that figure being shaded in isolated cases have been heard. Despite softness, hope is expressed that the 1.20c level can be established. Scarcely any demand for delivery after tomorrow is reported.

Plates Remain Weak

Chicago, March 30.—Steel plates present the weakest face of any finished steel products in this territory. As low as 1.24c, Chicago, has been done for early delivery by a central western mill. During the past 30 to 60 days, local mills have been receiving orders for plates to go into tanks for the Oklahoma and Texas oil fields, business which ordinarily would have gone to Ohio and Pennsylvania mills. For some reason, Chicago and Kansas City tank makers have been active in this field and have landed considerable business not ordinarily fabricated in the west. This demand along with other activities has had the effect of improving demand for steel plates somewhat, although not sufficient to firm the market to the same level as bars and shapes.

Weak at Cleveland

Cleveland, March 30. — The plate market in the Cleveland district is weak and as low as 1.05c, Pittsburgh, has been done for early delivery.

Spelter Market is Dull

And Uncertainty Prevails—Important Producers Sold Up—London Tin Market Reacts

New York, March 30.—The spelter market is dull and prices are rather difficult to gage, by reason of the lack of business. A feeling of uncertainty continues to prevail, and, in fact, some producers are not feeling as cheerful as they were a while back. This is due to the manner in which the recent manipulation of the market has scared off consumers. The situation in the market, however, remains unchanged; at least seven important producers are sold up nearly full two months ahead, and most of them are well sold up through June. It seems only a matter of time before buying again must commence, since domestic consumers are not covered ahead to any marked extent, and there has been no export buying for some time past. The unsettled state of the market is shown by quotations a galvanizer received on a limited tonnage a few days ago. On deliveries scattered over April, May and June, this concern received the following quotations, delivered, Pittsburgh: 9c, 8.37½c, 8.30c, 8.62½c; this consumer also received a quotation of 9.27½c, Pittsburgh, on the first half of April, and 7.55c, Pittsburgh, on June.

The London tin market reacted spectacularly last week, when the British government announced it would not permit any more exports of the metal to neutral countries unless they were consigned to British consuls. The last few days, however, it has recovered just as sharply. Here the market is being well maintained, due to the scarcity of spot. This scarcity is expected to be relieved shortly. The trade generally expects much lower prices. Consumers are not buying much at present prices, being well covered as a rule. Spot is quoted at 53c, April at 41c, May at 39c, and June at 38.25c.

The lead market is very firm by reason of good domestic demand and a heavy export demand. The Smelting company now is asking 4.15c, New York, on domestic business, but is expected to advance. On exports this interest will do nothing less than 4.25c, New York. Independent sellers are selling export lead at 4.15c, St. Louis, shipment by way of Galveston; on domestic business these interests are quoting 4.10c to 4.12½c, St. Louis.

The copper market is strong and producers are well sold ahead. On electrolytic some first hands are asking 16c, but the metal can be obtained at 15.62½c to 15.75c, delivered 30 days. Casting is quoted at 15.37½c to 15.50c, usual terms, although one producer is asking 15.75c on a special brand. The best brands of lake copper are held at 16.50c, cash; good ordinary brands at 15.75c to 15.87½c, cash, and arsenical brands at 15.62½c, cash.

The antimony market is dull, but strong, as supplies are just as scarce as ever. Cookson's has been sold at 32c, H. H. French at 26c, and Spanish at 25c. Spot Chinese and Japanese is quotable at 21c to 22c, duty paid. Limited tonnages of future Chinese and Japanese are offered at 19.25c, in bond, for April shipment.

The aluminum market continues strong. No offers are heard on futures. Spot is quoted at 19c to 19.12½c.

Edgar G. Brosius, manufacturer of grab buckets, etc., has moved his office from the seventh floor to the sixteenth floor of the Benedium Trees building, Pittsburgh.

(*For complete prices see page* 696.)

English Ferro Has Arrived

First Delivery Since Inauguration of Embargo—Consumers Hope to See Regular Shipments

New York, March 30.—With the arrival at eastern seaboard during the past week of approximately 1,000 tons of English ferro-manganese, representing the first delivery since the inauguration of the embargo early in November, consumers are led to believe that the much-promised resumption of regular shipments under government licenses, soon will be accomplished.

The shipments arriving during the week were 450 tons by the Manchester Mariner, 300 tons by the Manchester Shipper, both at Philadelphia, and 270 tons by the Quernmore at Baltimore. All of this tonnage is consigned through one seller, but there appears to be some question whether it will be distributed among regular customers under old contracts or will go to certain companies which are manufacturing munitions of war for the Allies. There is some talk that certain of these companies have been allowed some tonnage so that their war contracts may not be disturbed. It is not established positively, however, that such an arrangement has been made or that all the tonnage will go to these particular consumers.

The shipments which just have come in all have gone by way of the port of Liverpool on the west coast, where shipping conditions are more favorable than on the east coast because of the war zone. Some tonnage has been on the docks at Liverpool awaiting shipments, for several months. It is quite probable, in view of shipping conditions along the east coast, that all consignments from the various makers to this country under recent licenses will go by Liverpool. This will necessitate the shipment by rail to that port by the makers in the Middlesbrough district.

While, as stated, all the arrivals of the past week have been directed to one representative of English producers, other direct agents in this country are anticipating that their shipments of 500 tons each will proceed shortly, if they already are not under way. Cables of the past week have informed them that final arrangements for shipping were being made and have asked that instructions be given as to the division of the tonnage between ports on this side.

The American Manganese Mfg. Co., operating the Dunbar, Pa., furnace, is planning to run on 80 per cent ferro-manganese, using a mixture of Brazilian manganese with about 20 per cent of Cuyuna manganiferous ore. Perhaps, 1,500 will be made for the market. Heretofore, the Dunbar furnace has not made over 40 per cent ferro-manganese. The prices which this maker has been quoting are, $60, furnace, for 40 per cent ferro-manganese; $45, furnace, for 30 per cent, and $27, furnace, for guaranteed 20 per cent spiegeleisen. The Maryland Steel Co. recently has completed the making of a tonnage of 70 per cent at Sparrows Point.

An active demand both domestic and foreign for 50 per cent and higher grades of ferro-silicon has developed. Some sellers report their bookings recently have been the largest in their history. Prices are unchanged at $71, Philadelphia or Pittsburgh, for 600 tons or more, with $1 and $2 higher for smaller lots.

Alloys Quiet at Pittsburgh

Pittsburgh, March 30.—The resumption of ferro-manganese shipments to this country has relieved the situation in western Pennsylvania, and additional tentative inquiries are reported. But no sales have been made in the open market. This alloy is listed at $78, seaboard, for future and from $90 to $100 a ton for prompt delivery. Other alloys are in fairly good demand, but the market shows no great snap. Spiegel is being held at $28 a ton at the furnace, but expressions are heard that an attractive inquiry would bring out lower figures. Irregularity continues to feature the market for ferro-tungsten and ferro-molybdenum. Vanadium is quoted at a range from $2.25 to $2.75 per pound of contained vanadium. Ferro-carbon titanium is quoted at from 8c to 12½c per pound. Fifty per cent ferro-silicon is nominally quoted at $73, Pittsburgh, for small lots; from 12 to 13 per cent ferro-silicon is named at $20, furnace.

Getting in Closer Touch

Chicago, March 30.—The iron and steel sub-division of the Association of Commerce of Chicago, of which O. J. Abell, of *The Iron Age,* is chairman, and S. J. Llewellyn, of the Interstate Iron & Steel Co., is vice chairman, is undertaking to develop the common ground of interest already existing for members of the association. Plants are so widely separated in this city and its vicinity and products are so diversified that men whose interests really center about the same industry frequently are not in touch in a business and social way. This is somewhat of a handicap and the effort is to be made to bring about a closer unity that the entire trade may have a better understanding of itself as a whole.

Plans are under way to bring about this result and to apply a united front in the pursuit of common objects and the solution of common problems.

(*For complete prices see page* 696.)

Manganese Ore

Commands Somewhat Higher Prices Due to War Conditions

Philadelphia, March 30.—Prices for domestic manganese ore recently have undergone some advance, as sales have been made at 30 cents per unit, delivered to the plant of the consumer for 49 per cent mineral. Offers to buy at this figure still are being made by certain consumers. The Carnegie Steel Co., however, has not changed its official schedule of 26 cents per unit, delivered in the Pittsburgh and Chicago districts for 49 per cent ore.

Uncertainty over foreign supplies of ferro-manganese and the increased manufacture of this and similar manganese alloys in this country, have stimulated considerable interest in the manganese ore market. More attention is being given to the development of the small deposits in Virginia, Wyoming and other states. Very little Brazilian ore now is offered in the market and it is understood the prices for this material now range from about 40 to 45 per cent per unit of manganese at tidewater. A recent purchase of several cargoes of Spanish low phosphorus iron ore to an eastern Pennsylvania furnace, recently referred to, now is being delivered. One cargo is about to arrive.

No Interest at Cleveland

Cleveland, March 30.—While it is true that nearly all of the 300,000 tons of pig iron recently sold at Buffalo will be made from new ore, ore sellers are not willing to admit that the low prices of pig iron named at Buffalo furnish any indication of what ore prices for this year's delivery will be. Furnaces are showing no interest in ore and there is no prospect of the early opening of the market.

Canada recently raised the duty on machine tool imports into that country from 27½ per cent to 35 per cent ad valorem.

Largest Volume

Of Structural Contracts in Eight Months—Prices Shaded

New York, March 30.—Reported contracts for structural steel work awarded in New York City or immediately surrounding territory during March approximated 60,000 tons, which represents the largest volume in at least eight months. These awards include about 20,000 tons of subway and elevated work, and in addition, the 16,000 tons for the large Chesapeake & Ohio bridge placed through New York engineers. The remainder was made up of miscellaneous work. It has been the recent growth of miscellaneous work that has been most conspicuous in this territory and some other eastern districts. This expansion of mixed inquiry and of lettings has continued rather spasmodic. Two weeks ago, the volume appeared to have tapered off. During the past week, the activity has been better, new inquiry reaching at least 5,000 tons, and lettings 4,000 to 5,000 tons. Notwithstanding the broader market, there is little to be said as to improvement in fabricating prices which continue at low levels. Plain material prices remain not over 1.10c, Pittsburgh, or 1.259c, New York, on any lot of size. On very large tonnages, it still is probable that certain mills in eastern territory will shade this figure.

Drift in Right Direction

Philadelphia, March 30. — Certain eastern structural shape mills which recently increased their operations to around 60 per cent of capacity have been able to maintain this betterment and the indications point to a further gain in April. The expansion of the market continues to slow orders, but the trend is all in the right direction. Comment is made upon the fact that the Reading railroad now is buying some bridge work and plain material which, though small, represent the only orders of this kind by the road in more than six months. The new Munsey building at Washington, 1,000 tons, which was awarded the Jones & Laughlin Steel Co. about a year ago and then was held in abeyance, is now proceeding. The number of small structural jobs coming onto the market in this city has increased noticeably. A new building for the department of the interior at Washington, 3,000 tons or more, will be out for figures sometime in May. Railroad inquiries in this district show no improvement and are unimportant. The advanced price of 1.20c, Pittsburgh, or 1.359c, Philadelphia, for second quarter now is being quoted by eastern Pennsylvania mills, and at least one small contract has been made on this basis. For early delivery, the market is 1.10c to 1.15c, Pittsburgh, which large orders probably could shade. The Phoenix Bridge Co. has taken several small bridges for the Servian government calling for several hundred tons of steel.

More Activity

Buffalo, March 30.—Fabricators report an increase in activity as the season advances. Lower prices are being quoted on fabricating by some of the interests of the district having little unfinished business on their books. Other interests report that a good volume of business is coming in or is in the course of development.

Structural Demand Slight

Chicago, March 30. — Demand for shapes in the west has been rather light recently and building projects closed within the past week aggregate only about 700 tons, in three items, none of which is important.

Impending labor difficulties have something to do with slowness of building operations in Chicago as builders are averse to undertaking new structures until assured serious delays will not be met later.

Shapes Boosted $1

Pittsburgh, March 30.—Structural plate and shape makers are withdrawing prices below 1.20c for delivery after March 31, but some doubt is expressed as to the ability of leading makers to establish the market at 1.20c, with material being offered at present at 1.10c, Pittsburgh, by some mills. Irregularity is reported in nearly all districts. Interest is taken in the situation growing out of the award of the Schenley high school building here to a contractor not the lowest bidder for the undertaking. The contract has been declared void at law, and new bids will be asked. The Riter-Conley Mfg. Co. had been engaged to furnish structural steel, amounting to 1,600 tons.

CONTRACTS AWARDED.

Ayer loft building, Broadway and Twenty-sixth street, New York City, 1,900 tons, awarded Hay Foundry & Iron Works.

Slattery loft building, West Twenty-fifth street, 500 tons, awarded Hedden Iron Construction Co.

Pipe foundry for the United States Cast Iron Pipe & Foundry Co., Birmingham, Ala., 1,000 tons, awarded Virginia Bridge & Iron Works.

Bridges over New York State Barge Canal, Utica, N. Y., 600 tons, awarded Phoenix Bridge Co.

Wheeler office building, Bridgeport, Conn., 300 tons, awarded Levering & Gerrigues.

Chelsea warehouse, 107th street and Amsterdam avenue, New York, 700 tons, awarded Milliken Bros., Inc.

Bridge work for Pennsylvania railroad, 400 tons, awarded Fort Pitt Bridge Works.

Bridge work for the Southern railroad, 480 tons, awarded McClintic-Marshall Co.

Curtiss Aeroplane Co., new plant Buffalo, 300 tons structural, to Ferguson Iron & Steel Co., Buffalo.

Shields estate, San Francisco, garage, 100 tons, to Pacific Rolling Mill Co.

John Pritzlaff Hardware Co., warehouse, Milwaukee, 165 tons, to Milwaukee Structural Steel Co.

Albert E. Cook store building, Chicago, Ill., 484 tons, to A. Bolter's Sons.

Brewery and warehouse building for private interests at San Francisco, 2,300 tons, awarded to the Jones & Laughlin Steel Co.

Rochester Business Institute, Rochester, N. Y., 200 tons, awarded F. J. Hughes.

CONTRACTS PENDING.

Office building for Vincent Astor, Broadway and Vesey street, New York, 1,500 to 2,000 tons or more, bids being taken.

Loft building on Hoffman House site, Twenty-seventh street and Broadway, New York City, 3,500 tons or more; tentative plans issued.

Bridge work for Philadelphia & Reading railroad at Reading, Pa., 150 tons, bids being taken.

Warehouse for Hunter & Dickson, Philadelphia, 150 tons, bids being taken.

Building for Department of Interior, Washington, 3,000 tons, or more, plans now being prepared and bids shortly to be asked.

W. H. Walker & Co., Buffalo, 11-story warehouse, plans developing, large tonnage structural.

Nagle warehouse, Jersey City, N. J., 1,000 tons, bids being taken.

Apartment for Cross & Cross, New York City, 1,000 tons, project temporarily discontinued.

(*For complete prices see page 696.*)

Nuts, Bolts and Rivets

Pittsburgh, March 30.—Advanced quotations for bolts and nuts, mentioned a week ago by *The Iron Trade Review*, are being asked by makers in this district. The advance was brought about by higher prices for steel bars. Specifications for nuts, bolts and rivets are described as fairly satisfactory.

Pipe Mills Active

Pittsburgh, March 30.—Iron and steel pipe mills are enjoying fairly good activity. Specifications against contracts are coming out in good volume and numerous inquiries for small tonnages are pending. Discounts for both iron and steel pipe are reported o be firmly maintained. Boiler tubes re quiet and somewhat irregular.

John C. Jay Jr., general manager of sales of the Pennsylvania Steel Co., has been made vice president of the Pennsylvania Steel Co. and of the Maryland Steel Co. This office has been created especially for Mr. Jay. Before becoming general manager of sales of the Pennsylvania Steel Co., Aug. 1, 1912, Mr. Jay was the New York district sales manager of the company, a position he had occupied since May 1, 1906.

Coke Bought

By Eastern Steel Co. and Pittsburgh Company is Negotiating

The Eastern Steel Co., Pottstown, Pa., has closed for 10,000 tons of blast furnace coke with a prominent Uniontown seller at $1.65, ovens, for April delivery. The figure is slightly above what had been regarded to be the market for 30 days' delivery. Several prominent shippers are asking $1.75, ovens, for shipment second half. The Pittsburgh Steel Co., which owns two blast furnace stacks at Monessen, is quietly negotiating for requirements after July 1. When operating both stacks the company consumes from between 30,000 to 40,000 tons of fuel a month. It is not improbable the present contract will be renewed. The spot furnace coke market is quiet. Demand for 72-hour fuel is comparatively light. *The Connellsville Courier* says production the week ending March 20 was 279,422 tons, a decrease of 285 tons compared with the week before.

Coke Oven Contract

The Republic Iron & Steel Co., Youngstown, O., last week formally awarded a contract for 92 additional by-product coke ovens to the H. Koppers Co., First National Bank building, Pittsburgh. When the new ovens are installed the by-product plant of the Republic company will consist of 160 ovens. The Republic company awarded the contract for the original unit of 68 ovens to the Koppers company two years ago. A benzol plant will operate in connection with the by-product coke oven plant as soon as installations can be made.

Cast Pipe

Eastern Foundries Standing Out for Higher Prices

New York, March 30.—Some of the larger eastern pipe foundries are standing out more firmly for advanced prices, especially in the smaller sizes. They are asking $22.50, delivered, New York and New England points, for 6 and 8-inch, and $2 higher for 4's. The larger sizes where the recent tonnage has not been so good, are not so strong. The advances are coming irregularly, however, and it is apparent that some makers still will shade the prices given on important orders. The volume of the market is well maintained. R. D. Wood & Co. have taken 165 tons of 6 and 8's for North Andover, Mass., at $21.69, delivered, 226 tons of 6 to 10's for Colon, Panama, and are the low bidders on 653 tons of 6 to 12's for the city of New York at $20.44, delivered. On this latter competition, this seller was $1 lower than any other shops.

Rails for Export

Figure Prominently in Inquiries — Pennsy Order Not Placed

New York, March 30.—A number of important new inquiries for rails for exports have appeared in the market during the past few days. About 10,500 tons of 75-pound rails and 3,000 to 4,000 kegs of spikes are asked for Great Britain by J. P. Morgan & Co. South Australia has asked for 9,000 to 10,000 tons of 60,-pound, and South Africa for 10,000 to 15,000 tons. In addition, Russia has out a new inquiry for 30,000 tons of 67-pound, which is believed to be a former lot of the same weight in a revised form.

In the domestic rail market, the principal inquiry pending is 20,000 tons of girder rails for the Chicago Railways Co. This is expected to be closed within the current week. The Pennsylvania railroad has deferred action in distributing the remaining 170,000 tons of its present year's order, and this delay is said to be due to business conditions. Practically all the test lots recently rolled by the mills under the proposed new specifications of this system have been completed and the costs ascertained, but in view of the delay in placing the main order, it is not known whether or not the new specifications will be made use of.

Pipe Company

Takes Large Tonnage of Southern Iron at $9.25

New York, March 31. (By wire.)—Purchases of southern iron the past week by the United States Cast Iron Pipe & Foundry Co. was heavier than previously indicated, exceeding 50,000 and may have reached 100,000. One seller alone took 40,000 tons.

Figuring With Pennsy

W. C. Franz, vice president and general manager of the Lake Superior Corporation, was in Bucyrus, O., last Saturday and the *Bucyrus Evening Telegraph* quotes him as saying that if he closes the contract for rails now pending with the Pennsylvania Co., he will have to stop taking orders because the plant at the Soo will have on its books all the tonnage it can roll for a considerable time.

Sheet Bars

Recently Sold at Low Prices, But Quotations Now Higher

Pittsburgh, March 30.—According to reliable information, sheet bars have been offered at considerably less than $19, mill, in some sections of Ohio, and prevailing quotations have been questioned by some western Pennsylvania consumers, who report material has been offered at less than current quotations. On the other hand, several of the more prominent manufacturers of billets and sheet bars regard the market as considerably stronger than it was 10 days ago. One prominent valley maker is asking $20 for April and $21 for May and June delivery, at the mill, and the only Pittsburgh maker figuring in the market is asking $21, Pittsburgh, for sheet bars. In fact, sales have been made at that price within the last few days, and second quarter contracts are being rewritten at about quotations published a week ago. Specifications against contracts for sheet bars in March were rather heavy, some mills entering more tonnage this month than in any 30-day period in more than a year. Wire rods are being held at about $25, Pittsburgh. Demand for rods for export has been fairly heavy, and several attractive orders have been placed. Pending inquiries, many of which are duplicated, involve from 15,000 to 25,-000 tons, according to estimates.

Advance

On Shapes, Plates and Bars for Third Quarter Expected

New York, March 31. (By wire.)—A further advance of $1 to $1.25, Pittsburgh, for third quarter plates, shapes and bars soon will be put into effect according to present indications. Leading producers probably will announce such advance in a few days.

This advance has been brought to a head by inquiries from manufacturing users for third quarter, particularly bars, and sales already have been made of the latter for that period at 1.25c.

Implement people are not yet buying beyond July, but previously reported purchases to fill out needs until July have been heavy.

The United States Steel Corporation now is running a little better than 70 per cent of ingot capacity. Specifications are good. Indications are that March will show small change either way in unfilled tonnage. Foreign business is heavy.

The Erie formally has closed with the Carnegie Steel Co. for 1.000 tons of rails previously noted.

Homestead Repair Shops Are Interesting

Description of Repair Facilities of an Important Plant in Pittsburgh District—New Methods Employed for Wabbling Rolls and Other Work

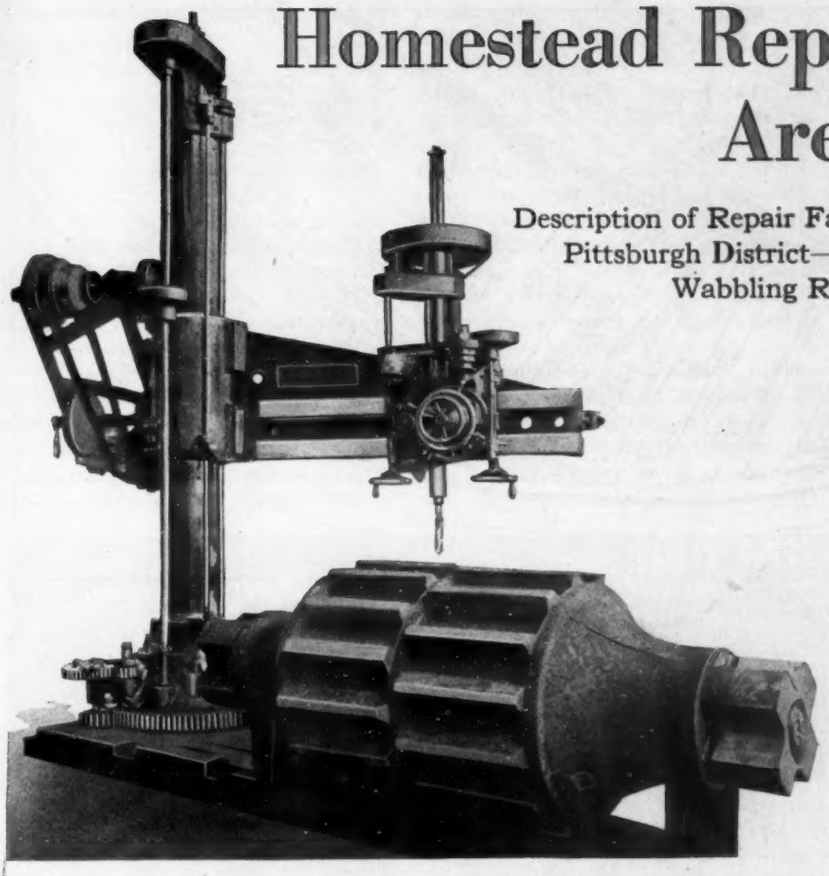


Fig. 1—Radial Drill at Work on a Roll Wabbling Operation

IN SEVERAL striking particulars the repair plant of the Homestead Steel works of the Carnegie Steel Co., Pittsburgh, is distinctive. Not only is the equipment unusually complete, including many tools of the very latest design, but the organization has been carefully worked out and the methods in vogue possess many features of interest. By the use of electrically driven portable tools which may be carried to the work at any part of the plant, the time required to make many important repairs has been reduced and the expense correspondingly diminished. The Homestead repair organization also is notable for its method of fluting roll wabblers in the general machine shop, as well as for the results obtained in the roll turning shop and for the achievements of the locomotive repair department. These features will be discussed in more detail later.

It will be remembered that the Homestead works was built in 1880-81 and that the first steel was made on March 19, 1881. In the 34 years that have elapsed since that time vast changes have taken place. The repair shop system is, therefore, the result of an evolution and there never has been an opportunity, as in the case of newer plants, to lay out the system as a unit. As a result of this condition and also because the amount of land available always has been limited, the repair shop buildings are located in various parts of the plant. Nevertheless the principal shops are conveniently situated and the work is handled without difficulty. In addition to the shops at the main Homestead works, auxiliary shops for emergency repairs, etc., are operated at the Carrie furnaces across the river and also at the Howard axle works.

Of course in a steel works of this character, a large number of spare parts must be kept on hand in order to avoid delays resulting from breakdowns. Most of them are stored at various points throughout the works, the object being to keep the parts as near as possible to the place where they will be needed for service. The location and general arrangement of the various units in the Homestead repair system are shown in the plan, Fig. 2.

How the Foundry Work is Handled

A limited tonnage of gray iron castings is obtained from the armor plate mold foundry which is situated near the east end of the works. Most of the castings which are required for repair purposes at Homestead, however, are obtained from the Edgar Thomson plant of the Carnegie Steel Co. In this connection it might be stated that in the opinion of some authorities, the operation of an iron foundry exclusively for repair purposes in connection with a steel works even as large as that at Homestead is of doubtful economy. If a foundry were built to handle the largest castings which would be necessary, it would very rarely be possible to operate it at anything approaching its capacity and consequently the overhead charges would be extraordinarily high. It is considered more economical under these conditions to purchase castings in the open market, except such as can be made satisfactorily with blast furnace or ordinary open hearth metal.

The general machine shop is centrally located at the foot of the roadway leading into the works from the general offices. It is 114 feet wide and 252 feet in length with a floor area of approximately 28,800 square feet. The building is of steel frame construction with a standard monitor roof. The main aisle under the monitor is 51 feet in width and is served by two traveling cranes. The larger crane is designed for a maximum capacity of 40 tons with a 12-ton auxiliary hoist and the smaller one is rated at 20 tons with a 5-ton auxiliary hoist. The heavy tools are arranged along both sides of the main bay under the crane and the lighter tools are situated in the side bays. Most of the tools are belt driven from line shafts, the power being furnished by an 18 x 24-inch steam engine. Heavy white lines are painted on the floor down the center aisle and around each of the heavier machines. They are termed "safety lines" and the passages between them are kept clear. This prevents dangerous obstruction of the aisles; also men passing to and fro keep within the areas indicated by the safety lines and know that they are in no danger of coming in contact with machines or work.

Some details regarding the tool equipment of the machine shop are given in the accompanying tables. The equipment, it will be noted, includes six boring mills with table diameters ranging from 36 inches to 123 inches; seven drill presses; eight grinding machines; eight planers ranging in size from 30 x 30-inch x 10-foot to 96 x 96-inch x 20-foot; six shapers ranging from 16-inch x 6-foot to 42-inch x 6-foot; three slotters;

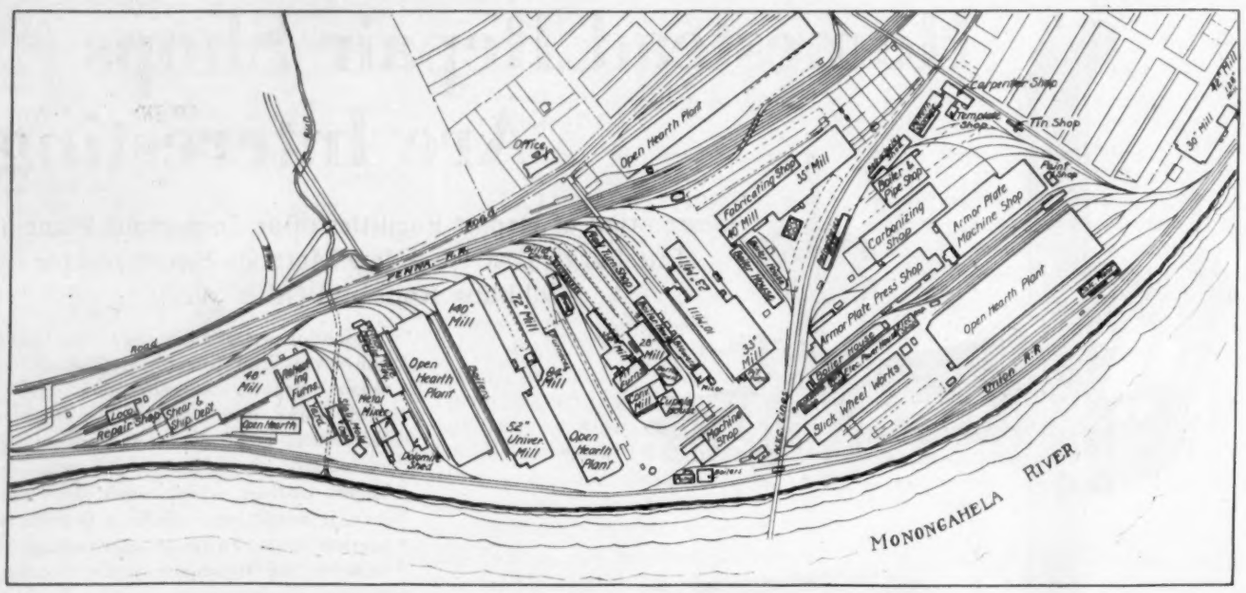


FIG. 2—GENERAL PLAN OF HOMESTEAD WORKS SHOWING LOCATION OF REPAIR SHOPS

three portable boring bars and 21 lathes ranging from a Le Blond machine with a 16-inch swing and a 4-foot bed to a Sellers tool with 72-inch swing and a 30-foot bed. The foregoing summary does not include the miscellaneous tools such as the gear cutting machines, welding machines, crank pin turning machines, bolt cutters, hack saws, rock drills, hydraulic jacks and hydraulic pushers.

Portable Tools Save Time and Money.

As stated above, portable tools are used freely. They are driven by individual motors and may be taken to any part of the plant as needed. They have been found particularly useful for making certain classes of repairs to heavy rolling mill equipment and on work of this character their use results in considerable economies. The labor required to transport heavy parts to and from the machine shop is obviated. With the aid of these devices, also, certain repairs may be handled much more quickly than with other means and the value of the time saved to the mills soon pays for the portable tool equipment. The portable tools used at Homestead include a 60-inch x 13-foot Morton portable slotter and three portable boring bars, 4-inch, 6-inch and 10-inch respectively; the latter has a working length of 16 feet. A floor plate is provided in the machine shop to which the portable slotter is bolted when it is not required outside. Under ordinary circumstances, therefore, it performs all of the functions of a stationary shop machine.

Attention also should be called to the specially designed heavy duty electric driven Morton shaper, Fig. 5, for fluting roll wabblers. This is a self-contained machine as indicated in the illustration. Before it was available, the wabblers were fluted on a planer. Before the wabblers are formed on the shaper, they are drilled on a heavy radial drill as shown in Fig. 1. The rolls are made of dense hard metal which is difficult to cut, a typical analysis of the steel being as follows: Carbon, 0.42 per cent; manganese, 0.72 per cent; nickel, 3.05 per cent; silicon, 0.24 per cent; phosphorus, 0.02 per cent; sulphur, 0.031 per cent. The following table gives an idea

FIG. 3—THE PATTERN SHOP IS THOROUGHLY EQUIPPED

of the amount of work involved in wabbling rolls:

Diameter of roll, inches.	Diameter of wabbler. inches.	Length of wabbler, inches.	Cubic inches of metal removed from four wabblers.
23	12	8	221.44
32	17¾	12	654.24
33	18½	10½	711.48
35	20	11¾	973.37

The fluting operation on a 35-inch nickel steel roll required 20 hours on the planer; on the shaper it has been reduced to seven hours. This gives an idea of the economy of the shaper for this class of work. The drilling operations on the same roll require six hours and the chipping work two hours. On a roll for the 23-inch mill, where 221.44 cubic inches are to be removed, the fluting requires three hours on the shaper, the drilling two hours and chipping one hour. The shop wabbles approximately 170 rolls per year.

This shaper is used for cutting keyways in sleeve gears and also for other work in addition to fluting. For cutting keyways the machine is particularly advantageous.

Adjacent to the general machine shop is a shop for repairing narrow gage locomotives. It is 30 feet in width and 100 feet in length provided with track pits and tool equipment for general locomotive work. This equipment includes a 3-ton Yale & Towne traveling electric hoist, a 30-inch x 6-foot Betts planer, a 24-inch x 6-foot Lodge & Shipley lathe, a 14-inch x 5-foot Prentice lathe, a 4-foot Baush drill press, a 16-inch Smith & Mills shaper and a 24-inch Hendey shaper. This shop takes care of the repairs for 56 narrow gage locomotives.

The roll shop is located near the main entrance of the plant as indicated in Fig. 2. The main building is 42 feet in width and 320 feet in length with leanto 18 feet in width and of the same length. The rolls are stored outside in a yard parallel to the shop approximately 50 feet wide and 300 feet long. The rolls are held in place by heavy upright I-beams. The shop is provided with ample crane facilities to take care of the work including 15 and 40-ton cranes in the main building and a 25-ton crane over the storage yard outside. The general arrangement of the roll shop is shown clearly in Fig. 4. As this illustration indicates, the tools are arranged in two rows down either side of the main bay, the aisle in the center being used for the storage of rolls in process. The tools are driven by individual motors and the equipment includes 19 roll lathes ranging from 18 to 60 inches swing, driven by motors ranging from 10 to 30 horsepower. A roll grinder also is being installed for grinding roll bodies and necks. The miscellaneous equipment in this shop includes two 6-foot grindstones; Ransom, Diamond and Taylor grinders; a 24-inch Lodge & Shipley general purpose lathe; a 30 x 30-inch x 8-foot Woodward & Powell planer; an 18-inch W. F. & John Barnes drill press and a 24-inch shaper.

This shop handles a large amount of work in the course of the year. Approximately 261 new steel rolls, 282 new iron rolls and 621 new chilled rolls are turned annually and in the same time 1,872 chilled rolls and 1,986 iron and steel rolls are dressed.

The standard gage locomotive repair shop forms another interesting unit in the Homestead shop system. It handles all of the light and heavy repairs for 36 locomotives. The buildings include a storeroom 27 x 96 feet, an erecting shop 54 x 247 feet, a tank shed 30 x 94 feet and a wash-out shed 50 x 140 feet. They are situated at the extreme eastern end of the plant as indicated in Fig. 2. The equipment includes tools for taking down and assembling engines, etc., the machine shop work, of course, being handled in the general machine shop described previously. This department employs an average of 50 men. An average of 21 engines are given heavy repairs per year and 1,300 engines are given running repairs in the same time. Over 5,000 flues are repaired annually. The average time for running repairs is 3½ hours per job and the efficiency of the work is indicated by the fact that the average cost per engine per month for labor and material is $1.15.

In a modern steel plant, facilities for electrical repairs are exceedingly important. The electrical repair shop at the Homestead works occupies two floors, each 58 x 126 feet. Complete gear cutting equipment is provided for this department in order to properly take care of motor gears and pinions. Three Gould & Eberhard

FIG. 4—GENERAL VIEW OF ROLL SHOP

Tools in General Machine Shop

Boring Mills.

1—10′ 3″ Ridgway.
1—11′ 5″ Pond.
1—48″ Niles.
1—36″ Bement-Miles.
1—56″ Bickford.
1—48″ Pond.

Drill Presses.

1—8′ Cincinnati.
1—5′ Pond.
1—6′ Bement-Miles.
1—4′ Baush.
1—10″ Allen.
1—6′ Ridgway.
1—6′ Pond.

Grinders.

1—No. 1 Cincinnati Universal.
1—16″ Alert Piston Ring.
1—No. 14 Brown & Sharpe.
1—Sellers Tool Grinder.
4—Wheels for tool grinding.

Lathes.

1—60″ x 23′ Bement-Miles.
1—48″ x 18′ Johnson.
1—36″ x 13′ Pond.
1—36″ x 36′ Schumacher & Boye.
1—72″ x 30′ Sellers.
1—24″ x 18′ Schumacher & Boye.
1—24″ x 17′ LeBlond.
1—36″ x 16′ 10″ Pond.
2—26″ x 12′ Draper.
1—18″ x 6′ Blaisdell.
2—25″ x 12′ Johnson.
1—30″ x 16′ Bement-Miles.
1—18″ x 9′ Schumacher & Boye.
1—18″ x 8′ 9″ Lodge & Shipley.
1—18″ x 8′ 5″ Johnson.
1—24″ x 14′ Johnson.
1—20″ x 6′ Lodge & Shipley.
1—16″ x 4′ LeBlond.

Planers.

1—60″ x 60″ x 16′ Pond.
2—42″ x 42″ x 12′ Pond.
2—30″ x 30″ x 10′ Gray.
1—96″ x 96″ x 20′ Bement-Miles.
1—42″ x 42″ 12′ Betts.

Portable Boring Bars.

1—10″ x 16′.
1—6″.
1—4″.

Shapers.

1—16″ x 6′ Gould & Eberhardt.
1—16″ x 6′ Niles.
1—24″ x 8′ Gould & Eberhardt.
1—24″ x 8′ Niles.
1—42″ x 6′ Draper Portable.
1—Morton Heavy Duty, for cutting roll wabblers and keyways.

Slotters.

1—36″ Niles.
1—15″ Betts.
1—60″ x 13′ Morton Portable.

Miscellaneous.

1—8″ x 8″ Baird Hack Saw.
1—No. 6 Keyway Cutter.
1—Furnace with Fan.
1—American File Sharpener.
1—2½″ Acme Bolt Cutter.
1—No. 5 Underwood Crank Pin Turning chine.
1—100-ton Hydraulic Pusher.
1—600-ton Pusher with motor-driven pun
1—Linde Portable Welding Machine.
1—36″ Gleason Bevel Gear Cutter.
2—Rock Drills.
2—Friction Hoists.
3—Hoisting Engines.
3—150-ton Hydraulic Jacks.
1—100-ton Hydraulic Jack.
1—60-ton Hydraulic Jack.
3—30-ton Hydraulic Jacks.

Three Impressive Tables

THE accompanying tables cover only a portion of the tools in the repair shops of the Homestead Steel Works of the Carnegie Steel Co., but they give a clear idea of the value, quantity and character of the equipment. A complete official list prepared by the executives of the Homestead plant, classifying and describing the equipment in the repair shops lists 302 separate tools. Yet the equipment at Homestead is not exceptional; there are many other steel plants in the country equally well provided with shop facilities. Few people realize the tremendous investment in tools and machinery necessary to fit out the repair shops of a modern steel works. The number of people who are familiar with the character of work handled in these shops or with the high order of ability and intelligence necessary for their organization and operation also are few. The data given on the accompanying pages covering the machining of 3 per cent nickel steel roll necks show that the steel plant repair shop must be as ably managed and as well equipped as the best manufacturing establishments.

Equally convincing is the information regarding the use of portable tools. These machines save the Carnegie Steel Co. thousands of dollars annually by expediting repair work. In making steel plant repairs, time is an all important element. In busy seasons, every hour that an important mill is tied up means a loss of several hundred tons of product, a decrease in gross sales ranging all the way from $600 to $5,000 and a shrinkage in net profits of from $200 to $1,500. The best of tool equipment is therefore demanded for repair purposes.

Tools in Carrie Furnace Machine Shop

Lathes.

1—24″ x 11′ 0″.
1—26″ x 11′ 0″.
1—38″ x 22′ 0″.
1—34″ x 17′ 0″.
1—20″ x 4′ 0″.
1—20″ x 8′ 0″.

Shapers.

1—18″.
1—24″.

Planers.

1—36″ x 36″ x 10′ 0″.
1—16″ x 48″ x 18′ 0″.

Miscellaneous.

1—16″ Slotter.
1—60″ x 36″ Boring Mill.
1—36″ Radial Drill Press.
1—24″ Radial Drill Press.
1—48″ Radial Drill Press.
1—24″ Stationary Drill.
1—Double Spindle (Special).
1—½″ to 2½″ Bolt Cutter.
1—24″ Emery Wheel.
1—Power Saw.
1—200-Ton Wheel Press with Motor Driven Oil Pumps.
1—12″ Wheel Drill Grinder.

Tools in Roll Shop

Roll Lathes.

3—60″ American Sheet & Tin Plate Co.
1—60″ Wheeling Mould & Foundry Co.
2—60″ United Engineering & Fdy. Co.
2—60″ Samuel Tretheway.
1—60″ Robinson & Ray.
1—50″ Robinson & Ray.
3—42″ United Engrg. & Foundry Co.
2—42″ American Sheet & Tin Plate Co.
1—34″ Scaife.
1—34″ United Engineering & Fdy. Co.
1—18″ United Engineering & Fdy. Co.
1—18″ Samuel Tretheway.

Miscellaneous Roll Shop Tools.

2—6′ Grindstones.
1—Ransom Grinder.
1—Diamond Grinder.
1—Taylor Grinder.
1—24″ Lodge & Shipley Lathe.
1—30″ x 30″ x 8′ Woodward Powell Plan'r
1—18″ W. F. & J. Barnes Drill Press.
1—24″ Shaper.
1—Roll Grinder for grinding roll bodies and necks.

Tools in Electrical Repair Shop

1—36″ Johnson Engine Lathe.
1—32″ Bullard Engine Lathe.
1—28″ Schumacher & Boye Engine Lathe
1—24″ Pond Engine Lathe.
1—21″ Prentiss Engine Lathe.
1—14″ Prentiss Engine Lathe.
1—27″ Lodge & Davis Engine Lathe.
1—24″ Lodge & Shipley Engine Lathe.
1—42″ x 42″ x 10′ Niles Planer.
1—24″ Niles-Bement-Pond Traverse Head Shaper.
1—6′ Prentiss Radial Drill Press.
1—5′ Bickford Radial Drill Press.
2—24″ Hendey Pillar Shapers.
2—Henry & Wright 2-spindle Sensitive Drill Presses.
1—54″ Bullard Rapid Produc. Bor'g Mill.
1—36″ Upright New Haven Drill Press.
1—Betts Horizontal Boring Mill.
1—Beaman & Smith Key-seat Milling Machine.
1—4-A Brown & Sharpe Universal Milling Machine.
1—No. 2 Garvin Universal Mill'g Mach.
1—20″ Diamond Disc Grinder.
1—Cincinnati Cutter Grinder.
1—72″ Pfauter Hobbing Machine.
1—Pfauter Hob Grinder.
1—Brown & Sharpe No. 2 Cutter Grind'r
1—63″ x 14″ Gould & Eberhardt Auto Gear Cutting Machine.
1—72″ x 14″ Gould & Eberhardt Auto Gear Cutting Machine.
1—103″ x 20″ Gould & Eberhardt Auto Gear Cutting Machine.
1—Roune Power Hack Saw.
1—200-ton Hydraulic Wheel Press. Colw'l
1—Acetylene Welding Outfit including 1 Messer Generator.

Tools in Howard Axle Works Machine Shop

1—36″ x 12′ Fitchburg Engine Lathe.
1—18″ x 8′ Fitchburg Engine Lathe.
1—14″ x 5′ Fitchburg Engine Lathe.
1—24″ x 8′ Lodge & Shipley Engine Lathe.
1—26″ x 9′ Schumaker-Boye Engine Lathe.
1—Brown & Sharpe No. 2 Milling Machine.
1—Woodward & Powell 36 ″ x 36″ x 12′ Planer.
1—Bickford 5′ Radial Drill Press.
1—Acme 1½″ Screw Cutter.
1—Niles 5′ Boring Mill.
1—Cox 6″ Pipe Cutting Machine.
1—Sellers Tool Grinder.
1—Bement-Miles 24″ Vertical Drill.
1—Gould & Eberhardt 24″ Shaper.
1—Challenge 14″ Power Hack Saw.

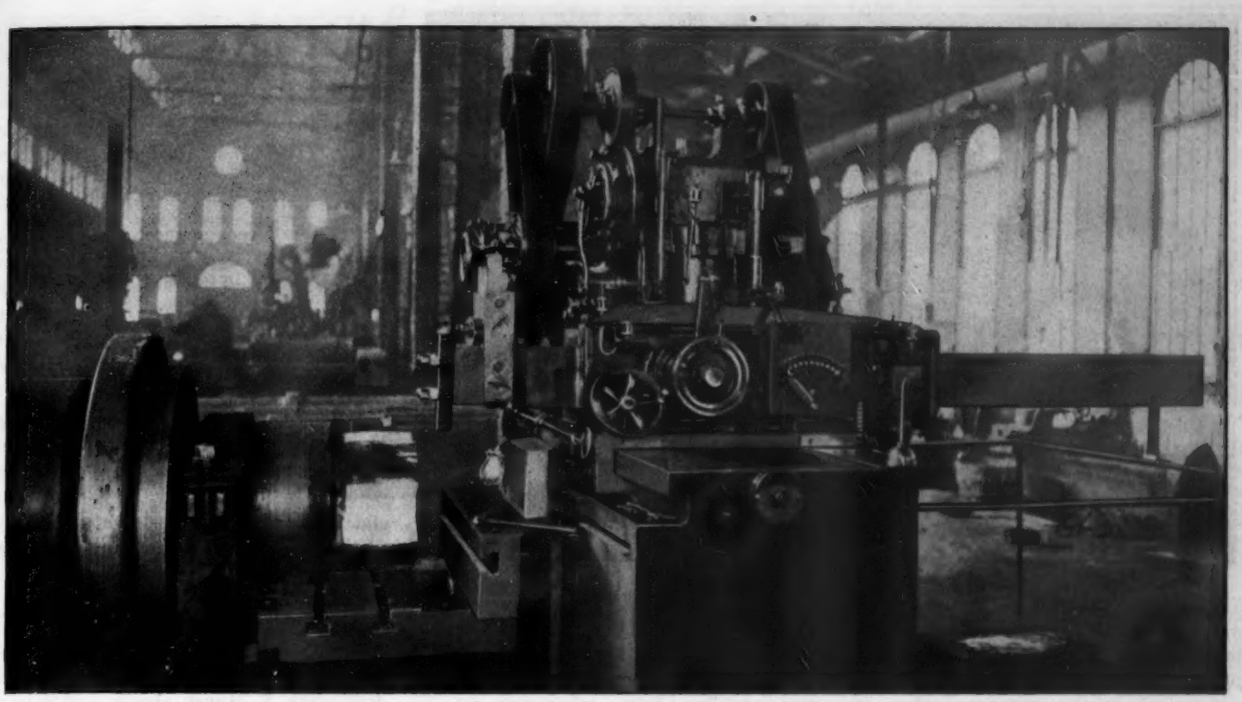


FIG. 5—SPECIAL MOTOR DRIVEN SHAPER FLUTING ROLL WABBLERS

automatic motor driven gear cutting machines ranging from 14 x 63-inch to 20 x 103-inch are installed, together with a 72-inch motor driven Pfauter hobbing machine, a hobb grinding machine and two cutter grinding machines. The hobbing machine is shown in Fig. 6 at work on large gear. In addition, this shop is provided with a large number of miscellaneous machine tools for handling electrical repairs, winding armatures, rebuilding motors, etc. A large number of spare armatures are kept on hand for the motors in service; they are stored at convenient points throughout the mills.

The carpenter shop, pattern shop, template shop and pattern storage loft form an interesting group situated at the western end of the works. The buildings are new and are of the latest design. Their relative arrangement is shown in Fig. 9. It will be noted that the carpenter and pattern shops are conveniently connected with the pattern storage and template shops by over-head bridges. The carpenter shop occupies the first floor of a two-story 50 x 150-foot building, the pattern shop being on the second floor. The template shop is 30 feet wide and 70 feet long, two stories in height and the pattern storage, which is 4 stories in height, is 60 feet wide and 200 feet long. Ample space for lumber storage is provided adjacent to the pattern storage building. The equipment in these shops is complete.

FIG. 6—PFAUTER GEAR HOBBING MACHINE IN ELECTRICAL REPAIR SHOP

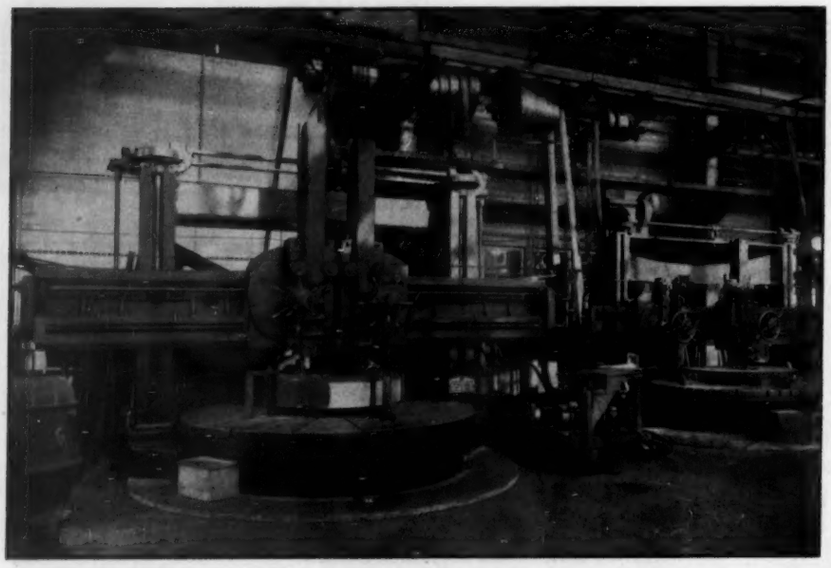


FIG. 7—LARGE BORING MILLS IN MACHINE SHOP

The pattern storage building has space for approximately 36,600 patterns, properly protected from fire. The tool equipment in the carpenter shop includes two band saws, two circular rip saws, one column scroll saw, a mortising machine, two hand jointers, a double surfacing machine, a wood turning lathe, two boring machines, one molding machine, one tenon machine and a saw filing machine. These tools are driven by belt and shafting from a 30-horsepower motor. The pattern shop equipment includes two circular rip saws, two band saws, four lathes, two hand jointers and a pony planer.

In the immediate vicinity of the carpenter and pattern shops are the paint shop and paint storage building. The latter is 25 x 60 feet and the former 24 x 60 feet. A suitable stock of paints for protecting wood and metal surfaces is kept on hand and the paint shop is provided with a paint mixing machine having a capacity of 20 barrels per day. This makes it possible to mix paints from the raw colors and oils as they are needed for various purposes.

The tin shop, also located at the western end of the works, is 22 x 28 feet in size. It is equipped with circular and squaring shears, a 2½ x 37-inch roll former, a 30-inch bar folder, a pipe former, a No. 5 Stow reaming machine and an 8-foot Eureka clamp, together with turning, burring, beading, grooving and setting-down machines.

The blacksmith and bolt shops occupy one building 58 feet x 250 feet in size. The equipment includes tools for heavy and light forging, including five steam hammers ranging from 1,100 to 6,000 pounds. A forging machine, two Lewis bolt headers, three 1½-inch double Acme bolt cutters, and one 2½-inch double Acme bolt cutter.

The boiler repairs are divided, a portion of them being taken care of by the mechanical department, which also handles the tank work, plate work, etc., and a portion by the steam department. The mechanical department boiler shop is 80 x 92 feet. The equipment includes three sets of forming rolls ranging from 4-inch to 17-inch x 10½ feet, a hydraulic press, an 18-inch drill press, a rotary shear, a riveting machine, a No. 4 Hilles & Jones punch and a No. 4 Hilles & Jones combination punch and shear, together with miscellaneous tools. The pipe shop adjacent is 45 x 150 feet and is equipped with five pipe threading and tapping machines for handling pipe from 2 to 8 inches in diameter. Two No. 3 Morse & Dexter reseating machines and a small drill press also are provided. The steam department boiler repair shop is 63 x 38 feet. The equipment includes three lathes, a 24-inch shaper, a 30-inch drill and two small portable header facing machines. All except the latter are driven through belts by a 10-horsepower motor. The header facing machines are individually driven by ¼-horsepower motors.

Structural repairs are handled in a shop 50 x 400 feet in size which occupies a portion of the 40-inch and 35-inch mill buildings as shown in Fig. 2. It is equipped with punches, shears, gas-heating furnaces, laying out tables, and other facilities for fabricating work.

The auxiliary repair equipment at the Howard Axle works includes a machine shop and a blacksmith shop; the former is 46½ feet wide and 111½ feet long and the latter is 30 feet wide and 26½ feet long. The machine shop is equipped with five lathes ranging from 14-inch x 5-foot to 36-inch x 12-foot, a No. 2 Brown & Sharpe milling machine, a 36 x 36-inch x 12 foot Woodward & Powell planer, a 5-foot Bickford radial drill press, a 24-inch shaper and miscellaneous tools such as drills, hacksaws, grinders, etc. This shop also is provided with a small Niles boring mill, a 6-inch Cox pipe cutting machine, and a 1½ inch Acme screw cutting machine. The blacksmith shop at the Howard Axle works is provided with two steam hammers, 600 and 2,000 pounds respectively, together with three forges and oil and lead baths for tool dressing.

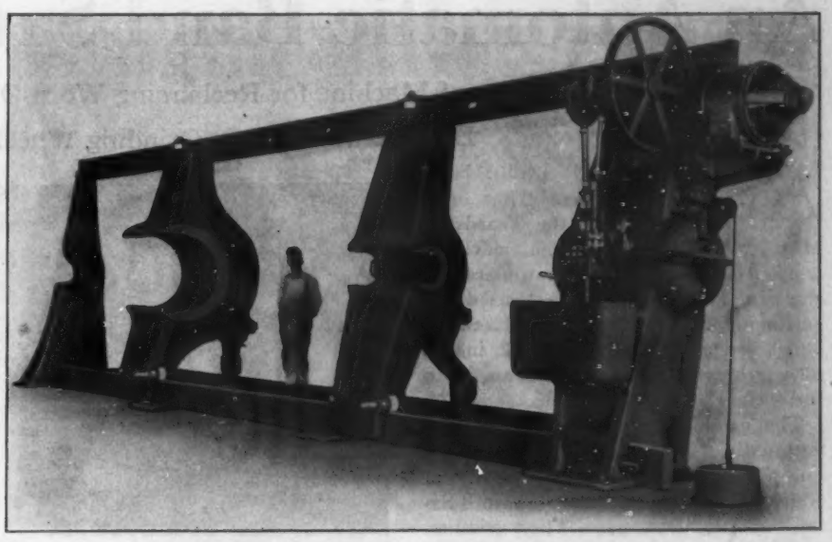
The Carrie furnaces are provided with a machine shop, a boiler and blacksmith shop, a pipe shop and a carpenter shop. The machine shop consists of a central bay 91 feet wide and 130 feet long with a leanto on each side 20 x 130 feet. The main bay is served by 10-ton traveling crane having a span of 47 feet. The equipment includes six lathes ranging

FIG. 8—A CORNER IN THE ELECTRICAL REPAIR SHOP

from 20-inch x 4-foot, to 38-inch x 22-foot, two shapers, two individually motor driven planers, 16 x 48-inch x 18-foot and 36 x 36-inch x 10-foot respectively, a 16-inch slotter, a 60 x 36-inch boring mill, three radial drill presses ranging from 24 to 48-inch, two small drill preses, a 2½-inch bolt cutter, a 200-ton wheel press with motor driven oil pump, together with saws, grinders, etc. The boiler and blacksmith shop is 50 x 96 feet provided with a 5-ton traveling crane having a span of 35½ feet. It is equipped with a 400-pound and a 1,500 pound steam hammer together with five forges, a natural gas heating furnace, a combination punch and shear and a 24-inch emery wheel. The pipe shop which is appropriately equipped is 27 x 44 feet and the carpenter shop is 37 x 49½ feet. The latter is equipped with a combination boring and mortising machine, designed to handle drills up to 2½ inches in diameter by 7-inch stroke and mortising bits up to ¾-inch with a 5-inch stroke. This shop also is provided with a 20-inch x 10-foot wood lathe, a band saw, a 20-inch circular saw with a table 5 feet 4 inches x 3 feet 5 inches and 24-inch grindstone.

The repair plant at Homestead is operated under the general direction of A. A. Corey, general superintendent, assisted by James Horton, efficiency engineer, and Richard Moon, master mechanic.

T. A. Willson & Co., Inc., Reading, Pa., manufacturers of eye protectors and goggles, were awarded a grand prize at the Second International Exposition of Safety and Sanitation recently held at the Grand Central Palace, New York City.



LARGE HYDRAULIC WHEEL PRESS

Hydraulic Wheel Press

One of the largest hydraulic wheel presses ever built, has been installed recently by the Chambersburg Engineering Co., Chambersburg, Pa., in the plant of the Otis Steel Co., Cleveland. The claim in regard to the size of the press rests not only in its tonnage but in the distance between tie bars and its maximum opening and speed.

The press is of the incline type, as shown in the accompanying illustration, permitting work to be handled into the machine by overhead traveling crane. Its capacity is 600 tons. The distance between tie bars is 9 feet while the stroke of the ram is 25 inches. The maximum distance between ram and resistance post in its extreme position is 30 feet. The machine is fitted with two resistance posts, one of which has a gap of 13 inches and the larger one, which is to be used for heavier shafts, has an opening of 36 inches. The tie bars are 4 x 12 inches and are provided with stops so that the resistance posts may be adjusted every 4 feet. When all three plungers are in operation, the ram has a traverse of 15 inches per minute. With the large plunger cut out and the two small plungers used to develop the maximum tonnage, the main ram has a speed of 4 inches per minute.

The cylinder beam and both of the resistance posts are cast of open hearth steel. The cylinder proper is copper. The machine is driven by a triple plunger pump, the pump body being a steel forging. The machine is actuated by a 15 horsepower motor.

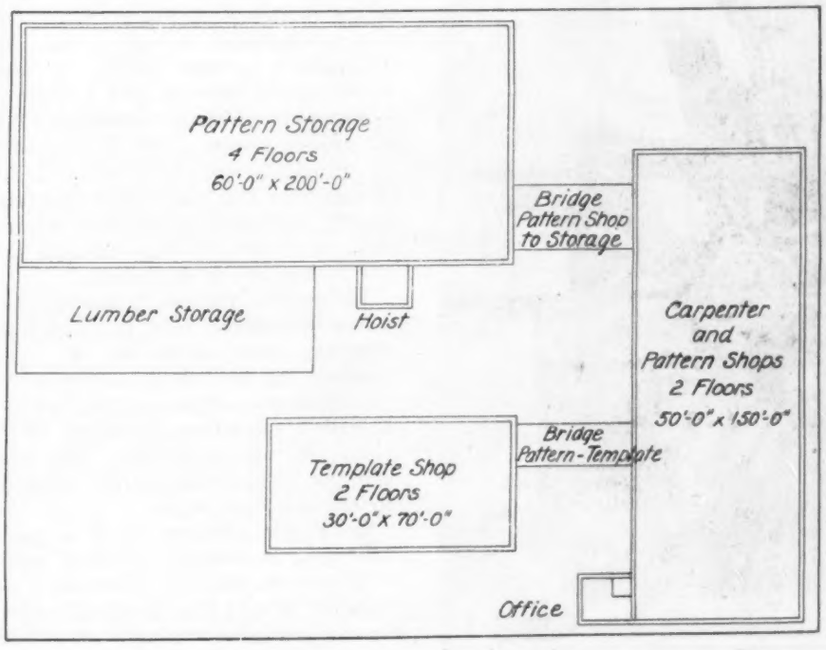


FIG. 9—SKETCH SHOWING ARRANGEMENT OF WOOD WORKING SHOP

"The Business Message of the Wrought Iron Bar," a series of 16 chapters on the peculiar fitness of wrought iron for various uses, which appeared in *The Iron Trade Review* about two years ago, have been done into a book by the Interstate Iron & Steel Co., First National Bank building, Chicago. In addition to the chapters on wrought iron, the company presents a number of half-tone illustrations of its plant with a description of the works and its operation. The process of making wrought iron is taken up from the handling of scrap to the complete product in the form of bars. The final chapter is devoted to tests with numerous illustrations indicating the toughness and resistance of this material.

For severe service it is a good plan to peen the surface of a babbitted box before it is bored or reamed to size.

An Automatic Band Saw Sharpener

Description of Machine for Reclaiming Worn Out Metal Cutting Band Saws—Elastic Grinding Wheel Used

AN automatic metal cutting band saw grinder recently has been brought out by the Wardwell Mfg. Co., Cleveland. The machine, which is designed to automatically sharpen band saws that are used for cutting steel, brass, bronze, aluminum and fiber, will handle saws 2 inches in width with teeth as fine as 26 to the inch.

The machine is claimed to be fully automatic. It is built with a solid one piece cast iron frame as shown in Fig. 1. The main drive shaft runs in babbitt bearings. The grinding wheel bearings are bronze, while all wearing parts are steel.

In operation a belt from the main drive shaft, which extends across the back of the machine, transmits power to the shaft which drives the grinding wheel. This shaft is supported on an arm suspended between hardened steel pivots which swing on a segment. This adjustment enables the grinding wheel to follow the face of the tooth regardless of its angle or hook. After the grinding wheel has reached the bottom of the tooth, a cam causes it to move up the back of the tooth, this cycle being repeated, permitting the wheel to follow down the face of each tooth and up over the back.

Power is taken from the main shaft through a worm gear to a shaft at one side of the machine on the end of which there is a slotted eccentric which governs the feed of the band saw. This slotted eccentric has a graduated scale permitting the operator to regulate the movement the proper amount to feed each tooth. A secondary adjustment is provided on the slotted rocker arm for making a more accurate regulation of the feed. An adjustment on the opposite side of the machine permits the saw to be fed in such a way that the grinding wheel cuts only the required amount of metal from the face of each tooth.

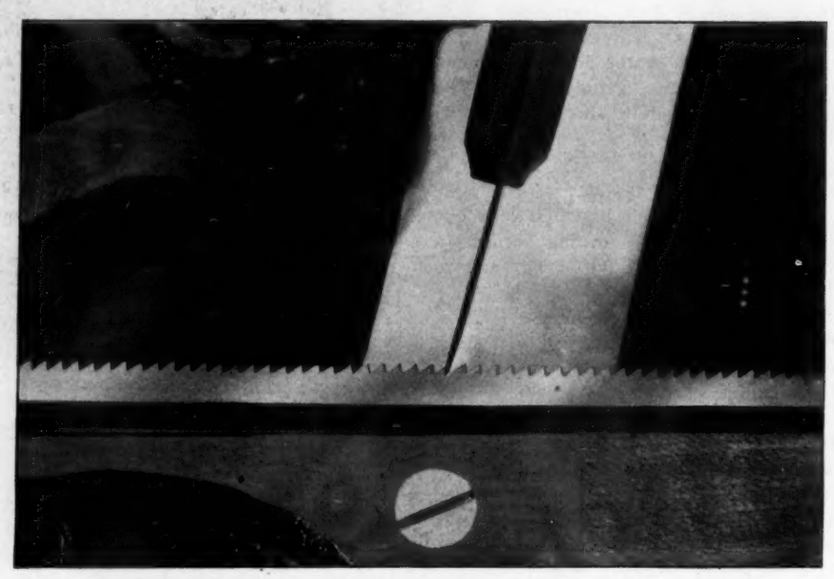


FIG. 2—CLOSE VIEW OF GRINDING WHEEL SHARPENING 18 POINT BAND SAW. MAGNIFICATION TWO DIAMETERS

Through the use of these adjustments, it is claimed that the grinding wheel can be timed so that when the wheel has traveled down the face of the tooth, the cam comes into action and raises the wheel as it travels up the back of the tooth. It is claimed by the builder that the operation of the machine is so exact that as little as 0.0005 to 0.001 inch can be removed from either the face or back of the tooth.

An adjustment on the front of the machine permits raising the saw in the vise in order to take a slightly heavier cut without changing the other adjustments. All adjustments are provided with lock nuts. It is claimed that this machine is fully automatic and after it has been started requires no further attention until the saw is completely sharpened.

The feed is through a double pawl giving a positive feed movement in case any teeth are broken out. The machine can be belt driven or direct connected to a ¼-horsepower motor, operating on either direct or single phase alternating current. This machine, it is said, will sharpen from 50 to 60 teeth per minute.

An elastic grinding wheel is used. In Fig. 2 is shown a grinding wheel 1/32 inch in diameter sharpening an 18-point saw. The grinding wheels operate at 3,400 revolutions per minute and the driving shaft revolves at 1,000 revolutions per minute.

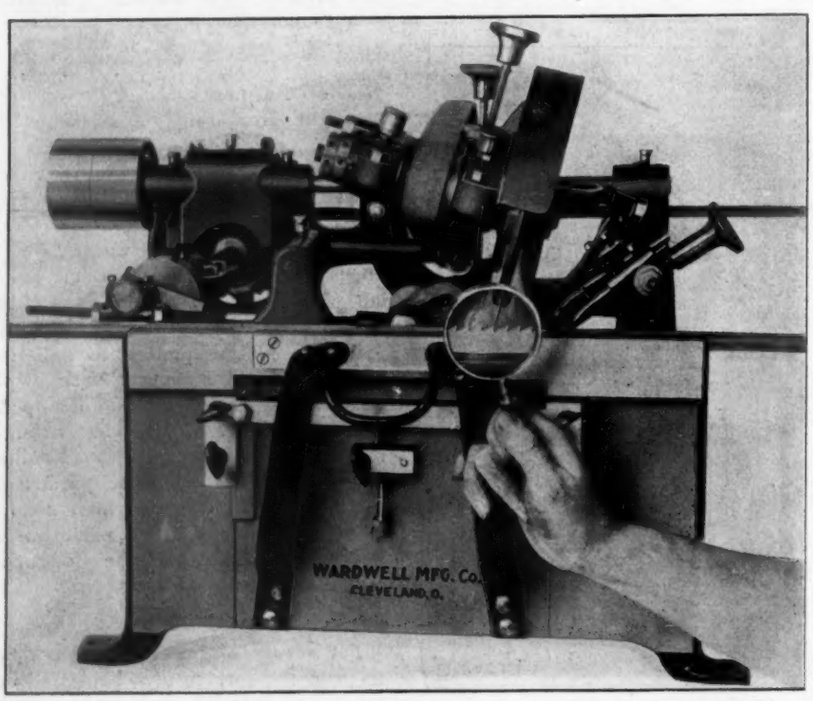


FIG. 1—AUTOMATIC GRINDER SHARPENING 18 POINT BAND SAW

How the Sales Engineer Gets Orders

A Discussion of His Services to the Man on the Firing Line—Good Sales Engineering Means Helping the Customer—Second of Three Articles

BY ALBERT A. DOWD

WHEN a salesman approaches a prospective customer who has in mind the purchase of a machine or machines suitable for handling a certain class of work, he is confronted by a number of conditions which affect the probability of the sale. The experienced salesman prepares himself for the encounter by learning as much as possible about the kind of work manufactured, the accuracy required on this class of work, shop conditions, etc., before he approaches the customer.

Much depends upon the steps which may have been previously taken by the salesman's company to pave the way. It may be that the manufacturer has a number of machines in the customer's factory, known to be giving excellent service, or, on the other hand, no machines may be in use and the customer may not be favorably disposed toward the particular kind to which it is desired to call his attention. In the former case the attitude of the customer will in all probability be favorable, while in the latter the visit of the salesman may take the form of missionary work to endeavor to influence the customer in the right direction so that his steps will not "go astray".

Let us suppose that the customer's attitude is favorable and that he has a number of machines already installed and in successful operation on certain classes of work. In this event, if he has need of more machines of the same type, the salesman's path is smooth and he is not likely to have any difficulty in obtaining an interview. In fact, the customer may have written to the manufacturer asking him to have the salesman call upon him, stating what class of machines he is likely to purchase. The salesman's object in calling, therefore, is to find out just what his needs may be so that the machine recommended will be that best suited to the purpose. If the manufacturer has simply received a request from the customer to have one of his salesmen call on him when he is in that particular vicinity, it is then up to the salesman to find out what the general run of work is, on which the contemplated machine is to be employed so that on his return to the home factory he can submit sufficient data to the sales engineer to enable the latter to thoroughly grasp the situation so that he can recommend the proper machine. Sometimes he asks for one or two blue prints, say of the largest and smallest pieces which it is desired to handle and gets an idea of the production required. In other cases he may only need to know the size of the largest and smallest work without requiring any blue prints at all. In still other instances the customer may require a machine with special tooling for producing a great number of pieces of the same kind, on which he wishes to secure the maximum production.

In any of these events the salesman can be of great assistance to the sales engineer by obtaining definite information on just exactly what the needs of the customer are and how the machine can best be adapted to them. He can also find out a little about the financial end of the matter and how the customer feels about the price of the machine and tools, so that the sales engineer may know

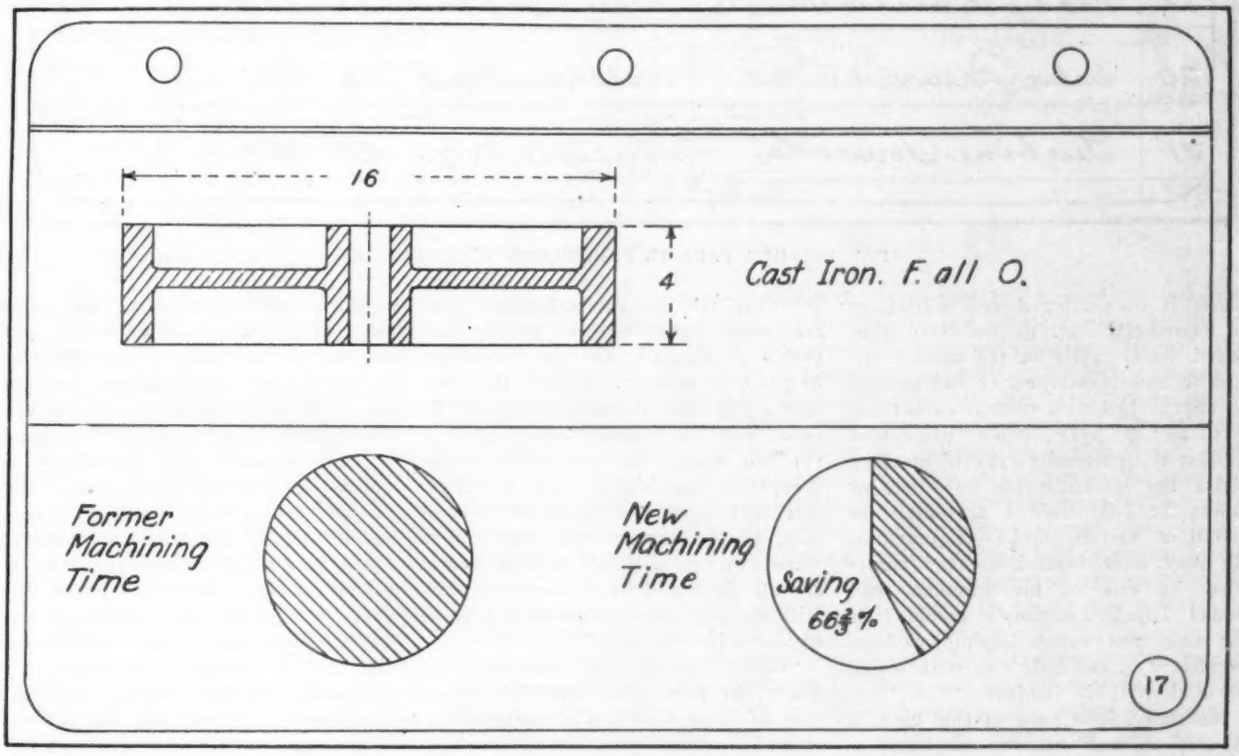


FIG. 1—A LEAF FROM THE SALESMAN'S SKETCH-BOOK

whether an elaborate equipment or a simple one seems the most desirable. All these items are considered in the event of the customer having requested a visit from the salesman to talk matters over, so that he can see and report upon the work in question.

How to Interest a New Customer

Now, let us look at the matter when the visit of the salesman is in the nature of missionary work, when he is trying to interest a manufacturer who is not acquainted with the product of his company. The salesman, in a case of this kind, must first of all manage to secure an interview, and in this he is likely to be unsuccessful unless the prospective customer is open-minded and willing to be convinced. If, as we have supposed, he is really in the market for one or more machines, he can usually be approached to a certain extent unless he is very much prejudiced against the particular type of machine which the salesman has to offer, or unless he has decided absolutely to install a certain make of machine. He may have been influenced somewhat by one of his foremen who thinks Blank company's machine is the only one worth buying, perhaps because it is the only one with which he is thoroughly familiar.

Naturally, in a case of this kind, it is very difficult for the salesman to obtain a foothold, except perhaps after many weary and seemingly futile visits; but with this part of the proposition we are not concerned.

Given, then, an interview, the salesman takes up the good points of the machine, ease of adjustment, adaptability, power, etc., and perhaps succeeds in interesting the customer to a considerable extent.

"Well," he finally says, "I guess your machine is all right, but we have a number of Blank company's machines already here, and they have given us good service for a number of years. I don't see any good reason why we should make a change. It would only complicate our tool equipment without giving us any great advantages that I can see."

"Why," replies the salesman, "our machines have nearly double the power of Blank's, and the feeds are 30 per cent coarser. Besides that, our tool equipment is more adaptable in every way, as I have shown you. I am not trying to run down Blank company's machines, only to show you that those you have are out of date, simply because they were made some years ago. Their new machines are all right and on a par with ours, with the exception of power and some of the minor details."

"Well," retorts the customer, "if that's the case, why shouldn't I buy one of their new style machines instead of yours?"

The salesman is prepared for this question and answers it by again calling attention to some of the advantages of the machine in which he has been trying to interest the customer, finally coming to the point of production possibilities. He brings out of his pocket a hand book of the loose leaf type, which contains among other data sheets, a number of small blue prints representing different varieties of work likely to prove of interest to a prospective customer.

The Salesman's Data Book

Fig. 1 shows one of these pages, and having turned to it, the salesman asks the superintendent whether he has any work of similar character to machine. It will be noted that the sectional view shown at the upper left hand portion of the sheet gives an idea of the general dimensions of the work so that a person in glancing at it can form an idea of its size. The material from which it is made is also specified and the finish required, in this case the work being of cast iron and finished all over as noted. Graphically delineated on the lower part of the same sheet, the two circles at right and left hand show very conclusively the savings in production time which have resulted from the use of improved methods. By comparing the fully shaded circle with the one only partially shaded, the actual time saving per piece is shown in the lighter portion of the circle.

NO.	CUSTOMER	LOCATION	SIZE OF MACHINE
15	Blank Auto Co.	Goshen, Ind.	30" B.M.
16	United Mach. Tool Co.	Kenosha, Wis	42" V.T.L.
17	P. & S. Tool & Supply Co.	Alma, Mich.	24" V.T.L.
18	Excelsior Model Works	Trenton, N.J.	24" V.T.L.
19	Ready Fibre Packing Co	Pittsburgh Pa.	24" V.T.L.
20	Salvo Pneumatic Co.	Waltham, Mass.	36" V.T.L.
21	Turbine Power Co.	Buffalo, N.Y.	54" B.M.

FIG. 2—INDEX PAGE IN SALESMAN'S SKETCH-BOOK

The customer becomes more interested and as the salesman refers to one after another of the blue prints, he finally asks if the pieces shown represent actual cases or if they are simply time studies. The number 17 in the small circle at the lower right hand corner, is looked up in the index, one page of which is shown in Fig. 2, and it is seen that P. & S. Tool and Supply Co., Alma, Mich., was the customer for whom that particular piece of work was done. Several other names are given on request, and the superintendent is told that these companies will undoubtedly confirm what has been stated if he cares to write them in regard to the matter.

Finally, the salesman, thinking that the psychological moment has arrived, asks the superintendent for two or three blue prints of the work on which he wishes to use the new machine and succeeds in getting them. He tells the prospective customer that he will take the matter up with the sales engineer and call again in a few days with suggestions for handling the work, time studies, etc. He finds out something about the accuracy required in the finished work, the number of pieces to be machined in a lot and obtains a promise from the superintendent not to purchase elsewhere until he has at least granted another interview and seen what suggestions are made. when he has reached this point, the salesman then goes on his way.

Now, it is easy to see how the sales engineer has helped to at least interest the prospective customer in this case and of how much service he has been, for in all probability if the salesman had not been able to produce the blue prints of work previously done and show the customer how other companies had saved money, he would have lost interest and the interview would have been unproductive of any good results. The small sheets with their graphical representations of savings effected, were gotten up at odd times by the sales engineer from records in his department at the home office, and are added to from time to time when interesting conditions are met. In a great many instances material of this kind is of value because it shows so conclusively just what the savings are, in such a way that the information can't be misunderstood.

Let us now suppose that the salesman has returned to the home office, bringing the prospective customer's blue prints with him together with other information which he gathered during his visit. Of course, in many cases the salesman would write and send the blue prints by mail, but in this instance he has made a special trip in the interest of this new customer in embryo. On taking up the matter with the sales department it is thought advisable to get up an estimate with tool layouts, time studies, etc., and submit it to the prospective customer as soon as possible.

The salesman, therefore, takes up the matter directly with the sales engineer, giving him all the information he has gleaned which can be of service to him, such as accuracy and finish required, number of pieces to be machined, other work likely to be handled on the same machine, etc. He points out to the sales engineer that the nature of the work does not require elaborate tooling, but rather an arrangement of standard tools to handle the material to the best advantage without unnecessary outlay, inasmuch as the work is handled in comparatively small lots. It will be seen that the salesman's information is of the greatest value to the sales engineer in enabling him to appreciate conditions which govern the work. Lacking this information, he would be somewhat in doubt whether to endeavor to get maximum production by means of special tooling, or to use standard tools as far as possible. There should always be the most intimate co-operation between the salesman and the sales engineer in order to obtain the most satisfactory results.

Having talked the matter over carefully and looked over the blue prints submitted, the sales engineer proceeds to "get busy" on the work. Let us follow his processes and see

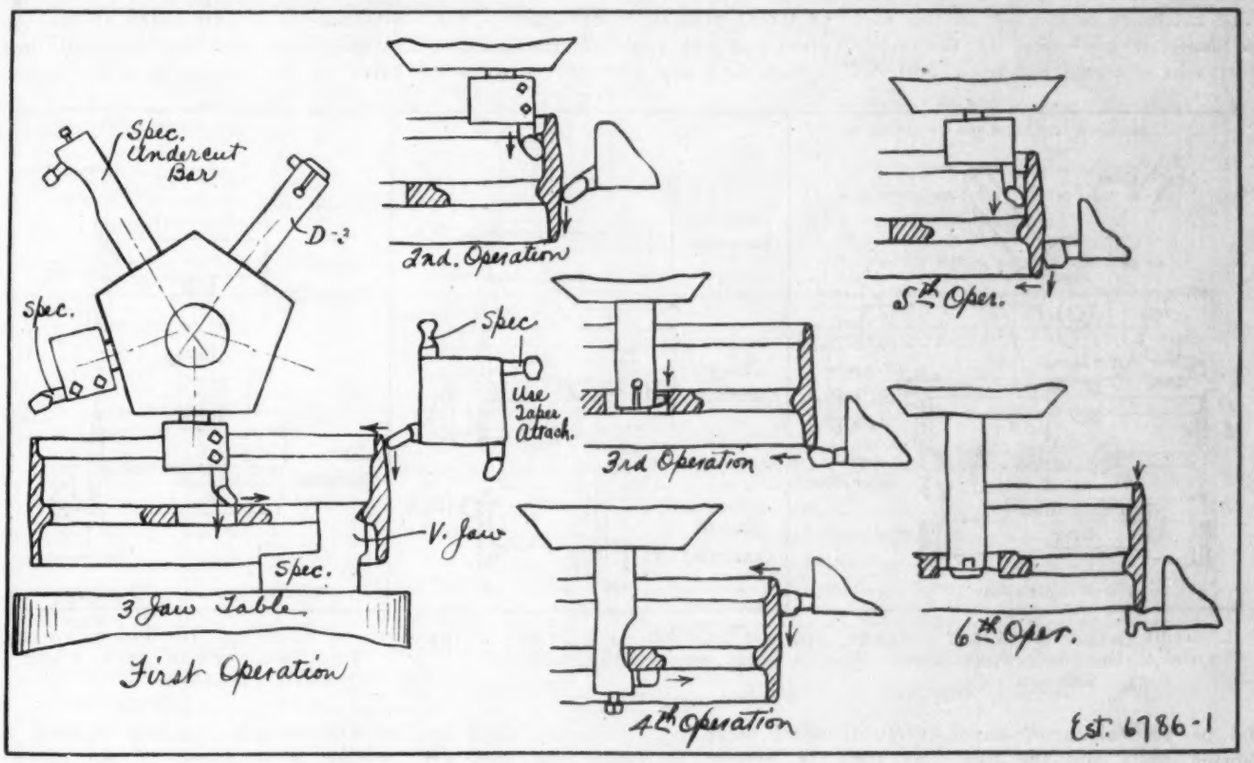


FIG. 3—FREE HAND SKETCH MADE BY SALES ENGINEER

how he works to benefit customer, salesman and manufacturer.

He first marks each blue print in red pencil with an estimate number (which in this case is 6786), giving each print this number followed by 1, 2, 3 or 4, as the case may be, for identification purposes. Taking a large pad he sketches out, free hand, a suggestion for the tooling arrangements, using standard tools as far as possible in order to keep down the expense, and arranging the tools in such a way as to keep the heads in operation, with as little loss of time as possible.

As much of the work of the sales engineer has to do with the handling of cylindrical work, the examples illustrated herewith are of that type. The machines most used on this sort of material are some of the many forms of chucking machines, horizontal or vertical turret lathes, vertical boring mills and the like. As the work is of large size, we will consider that a vertical turret lathe is suggested as the machine on which it is to be done.

One of the free hand sketches made by the sales engineer is shown in Fig. 3, and it will be noted that the sketch is so made as to give to the draftsman all essential information so that he has practically no need to ask questions. The method of holding the work is clearly indicated in the upper left hand portion of the illustration, together with the arrangements of tools in the turret and side head. Special tools are so marked and others are indicated clearly enough to enable the draftsman to understand what is meant. The sequence of operations for the various "cuts" is also marked on the sketch and the tools which are working simultaneously are indicated sufficiently to make the matter perfectly clear.

Sketches of this kind are made for all the pieces shown on the customer's blue prints, and are then turned over to one of the draftsmen employed on this special work. Using the sketches as a guide, he makes pencil layouts, quarter size, on thin tracing paper with a medium soft pencil, giving a good black line. These drawings are all made of uniform size so that they can afterward be bound up together when they have been blueprinted. In making these layouts the draftsman pays particular attention to the actual positions of the two heads and their relation to each other during the various operations so as to have them as far as possible in continuous operation and yet avoid interferences.

Figs. 4, 5 and 6 show the form in which these tool layouts are made up, the arrows indicating the direction of the cuts taken by each of the tools. It will be noted that Fig. 4 shows a general layout with all the tools in their respective positions, and that each tool is marked so that it can be referred to in the tool list. In addition to this, the surfaces are lettered A, B, C, etc, so they can be designated on the time study sheet.

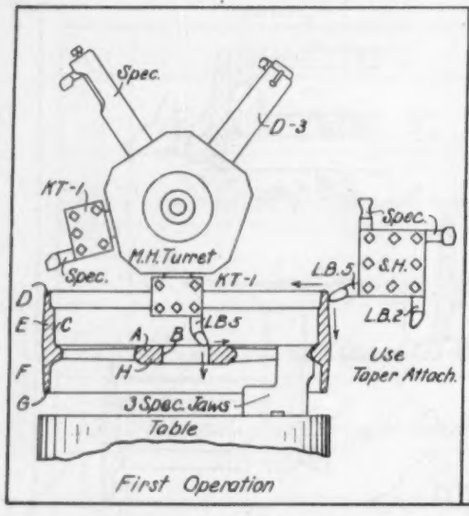


FIG. 4—DRAWING OF FIRST OPERATION MADE FROM FREE HAND SKETCH

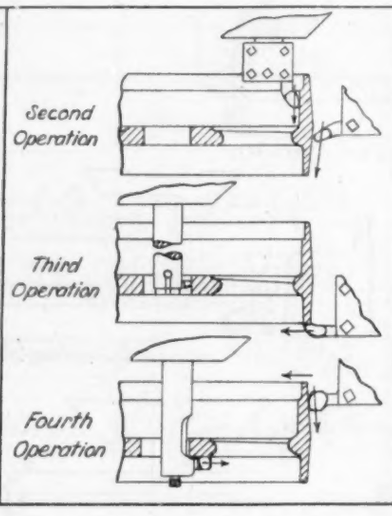


FIG. 5—DRAWING OF SECOND, THIRD AND FOURTH OPERATIONS

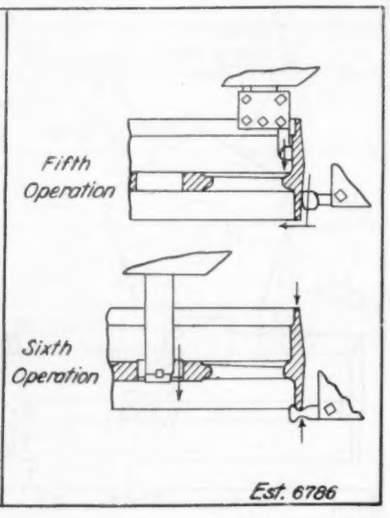


FIG. 6—DRAWING OF FINAL OPERATIONS MADE FROM FREE HAND SKETCH

Making Up the Time Study

After the tool layouts have been made, the sales engineer takes them and makes a careful time study of each piece, using the letters noted on Fig. 4 to indicate the surfaces which are being machined. The time study sheet is shown in detail in Fig. 7, and a reference to this illustration will show how conscientiously it is made, with allowances for setting and removing work, etc. A note is also made on this sheet regarding the amount of time estimated as being sufficient for setting up the machine, adjusting tools, etc., ready to begin the work. Due allowance is made in figuring feeds and speeds for indexing of the turret and side head, and it will be noted that heavy feeds and slow speeds are favored, rather than high speeds and finer feeds.

After the time study has been made, the operation sheet shown in Fig. 8 is filled out and the tool list, Fig. 9, is made. A reference to the former will show that all important data regarding the work are given. The name of the piece, pattern and drawing numbers, material, cutting speeds, type of machine, table chuck and the attachments are all noted at the top of the sheet, and the estimated time based on the time study is also given. It will be seen that the method of holding is described in the column marked *Setting,* and the various operations are specified in detail under the head of *Operations.* This sheet in connection with the blue prints of the tool layouts make the method of handling very clear as the exact surfaces to be machined are definitely specified.

Attention is called to the note at the bottom of the sheet. "This is not a guarantee of production. Time given is the result of a careful analysis of work submitted, assuming that cutting speed, feed, etc., recommended may be employed on material furnished; also that pieces to be machined are true to drawing and will not require removal of excessive material. Manufacturing conditions are further assumed and time does not include setting up of machine." Something of this

Estimate No. 6786-1 Time Sheet No. 1

For Genesee Motor Works, Genesee, Ohio

Mch. Reqd. 24" Vertical Turret Lathe

Piece Name Pulley

Piece No. 726

Material Cast Iron

All dimensions in inches.
+ = Two or more tools cutting at once in same head.
* = Simultaneous cuts.
— = Time not calculated but included in simultaneous cuts.
X = See note below.

SET G		OPERATION	CUTS: SURFACES	DIAM	LENGTH	SPEEDS: FT P M	R P M	FEEDS: PER	REV	TIME IN MINUTES: H HD	C HD	+	EL PRO
First	1	Face	A	7½	1½		6		1/32	8	—		
		Bore	B	4½	2		6 X 30		1/32	6	—		14
		Face	D	24	3/16	40	6		1/16	—	2		
		Turn	E	24	4		6		1/16	—	11		
	2	Bore	C	22	3		6		1/16	8	—		
		Turn	F	24	4	40	6		1/16	—	11		11
	3	Bore	B	4½	2		6 X 30		1/16	3	—		
		Undercut	G	24	1/4	40	6		1/16	—	2		3
	4	Undercut	H	7½	1½		10		1/32	5	—		
		Face	D	24	3/16		10		1/8	—	3/4		5
		Turn	E	24	4	60	10		1/8	—	3½		
	5	Bore	C	22	3		10		1/8	2½	—		
		Turn	F	24	4	60	10		1/8	—	3		4
		Undercut	G	24	1/4		10		1/8	—	3/4		
	6	Ream	B	4½	2		10 X 30		1/16	1½	—		
		Round	D-G	24	1/2	60	10		Hand	—	1		1½
											Total		38½
		Allow for setting & removing work											3
													41½
		Quote 40 to 45 min. each											
		Allow for setting up machine, adjusting tools etc. ready to begin work 3 hrs.											

Fig. 7

ESTIMATE NO. 6786-1. OPERATION SHEET NO. 1

For United Machine Tool Co., Kenosha, Wisconsin.

Special. AGENT.

Piece Name Pulley
B/P No. A- 3297
Pat. No. 439268
Material Cast Iron.
Cutting Speed 40 to 60 feet per minute.

Machine Recommended 24" V. T. L.
Tools 3 Jaw Combination.
Attachments Side head forming att.
Time per Piece 40-45 minutes each, floor to floor.

SETTING	OPERATIONS
First:- Hold work by inside in special jaws.	1. Face and rough bore hub with main head while rough facing flange and roughing one taper face with side head, using forming att. 2. Rough bore large internal surface with main head while completing outside taper with side head. 3. Finish bore hub with main head while undercutting rim with side head. 4. Undercut hub with main head while finish facing rim and one taper with side head. 5. Finish bore large inner surface with main head while completing outside taper and undercutting with side head. 6. Ream hub with main head while rounding edges of the rim with side head.

TOOLS LISTED ON SHEETS ATTACHED.

This is not a guarantee of production. Time given is the result of a careful analysis of work submitted, assuming that cutting speed, feed, etc. recommended may be employed on material furnished, also that pieces to be machined are true to drawing and will not require removal of excessive material. Manufacturing conditions are further assumed and time does not include setting up of machine.

11-20-12 A P Co

Fig. 8

ESTIMATE NO. 6786-1 TOOL SHEET NO. 1

For United Machine Tool Co., Kenosha, Wis.

Piece Name Pulley
B/P No. A-3297
Pat. No. 439268
Mch. Reqd. 24" V. T. L.

No Pieces	Name of Tool	Type-Std.	Type-Spcl	Included with Est. No.	Price		Memo	
1	Set (3) Jaws		Special					
1	Set Shoes & Scs	Stand.						
2	Tool Holders	K-T-1.		acc				
1	Comb. Bar.	D-3.	with cutters for 4-1/2 hole					
1	Undercut Bar.		Special					
2	Roughing Tools	L-B-3.						
1	Undercut Tools	L-B-2.						
1	Finishing Tool		Special					
1	Cornering Tool		Special					
1	Fin. Bor. Tool		Special					

REMARKS: TOTAL

OPERATIONS AS PER SHEET ATTACHED

Fig. 9

MANUFACTURING SUMMARY SHEET.

Estimate Number 6786.

For United Machine Tool Company.

City Kenosha, Wisconsin.

Submit through Local Agent.

Estimate Sub-number	6786-1.	6786-2.	6786-3.	6786-4.
Name of piece	Pulley.	Gear blank.	Collar.	Drum.
Blue-print number	A-3297	L-1962.	L-1640.	A-1645.
Estimated time for single piece, not including manufacturing contingencies.	40-45 m.	18-20 m.	32-34 m.	65-70 m.
Estimated time for 100 pieces, same conditions as above	71.6 hrs.	31.6 hrs.	56. hrs.	113.3 hrs.
Time estimated for setting up machine for job.	3 hrs.	1.5 hrs.	1.5 hrs.	2.5 hrs.
Time estimated for grinding and resetting tools, etc. for job	4 hrs	2. hrs.	3. hrs.	5. hrs.
Total estimated manufacturing time for job	78.6 hrs.	35.1 hrs.	59.5 hrs.	120.8 hrs.
Manufacturing time for single piece.	48 min.	21 min.	36 min.	72 min.
Individual Tool equipment complete	*******	*******	*******	*******
Complete tool equipment for all pieces listed without duplication of common tools.	*******	*******	*******	*******

Fig. 10

FIG. 7—TIME ESTIMATE SHEET
FIG. 9—TOOL SHEET

FIG. 8—THE OPERATION SHEET GOES INTO DETAILS
FIG. 10—MANUFACTURING SUMMARY SHEET GIVES COMPLETE INFORMATION

nature has been found necessary on all estimates of production because some customers take a statement of production time as an absolute guarantee that the work can be produced in the time given, and while in the majority of cases the time estimates will be found well within the mark, there are occasional instances when abnormal conditions affect the production in such a way that the estimated time cannot be made.

I remember one instance of this kind which will serve to illustrate the point. A western concern had ordered a machine for a particular piece of work which it was anxious to produce as rapidly as possible. The tool equipment was designed in such a way as to take advantage of everything which could be of assistance in giving a high production rate. The estimated time, made from a careful time study, was 28 minutes for each piece, and the statement was made in sending in the estimate that, "It is assumed that castings are well pickled, annealed and free from sand, and of a quality sufficiently good to permit a cutting speed of 45 to 50 feet per minute." When the demonstrator undertook to machine the pieces at the factory of the customer, he found the castings so hard and so full of sand that he was obliged to machine them at 30 to 35 feet per minute, and although he made every effort to bring the production up to the required mark, it was found impossible on account of the condition of the castings. About 35 minutes per piece was the best he could do, and as a consequence the customer was very much dissatisfied.

Satisfying the Customer

The matter was reported by the demonstrator to the home office, and as a result the salesman and sales engineer went out to look into the matter. The sales engineer being directly responsible for the estimate of production, pointed out the clause regarding cutting speeds on which the estimate was based and suggested that an interview with the foundry that furnished the castings might prove of value. A great improvement in the quality of the castings was the result, and no difficulty was found thereafter in keeping the production up to the mark. As a matter of fact, it was produced in a trifle better time than the estimate called for, so that the customer was in the long run, well pleased with his bargain. However, even when the assumption of conditions is stated on the estimate, there is always a certain amount of dissatisfaction when production is not lived up to, but it can nearly always be straightened out by an analysis of conditions and an application of the proper remedy, as in the instance mentioned.

Fig. 9 shows the itemized tool list, which specifies all tools used for each piece of work, a separate sheet being made out to cover each of them. Prices are given in the proper column although they are not shown in the illustration for obvious reasons. When tooling for several pieces is quoted, those tools which are common to more than one piece are so noted in the column marked, *Included with Est. No.*, and prices are quoted both for complete individual equipment, which means a complete set-up of tools for each piece, including tool holders, and also for equipment without duplication of tools common to two or more pieces.

The *Manufacturing Summary Sheet* illustrated in Fig. 10 is of the greatest value to a customer, for it not only gives in concise form the time estimate for each piece, but it gives time required for 100 pieces, time for setting up machine for the job, time for regrinding and resetting tools, total estimated time for the job, including setting up machine and other manufacturing contingencies as noted, and the manufacturing time for a single piece under these conditions, so that piece work prices can be set easily. Tool costs are also noted in their proper columns, so that the customer by referring to this sheet, has all the important points in a nutshell. The value of information of this kind which takes into consideration all manufacturing contingencies is highly appreciated by a prospective customer, as it leaves him nothing to do but set his piece work prices, everything pertaining to the manufacturing end of the question having been taken into consideration.

Blue prints of the tool layouts and all the other sheets except the time study are bound up in an attractive folder, and either sent to the customer or delivered in person by the salesman, depending on circumstances. A duplicate set is given to the salesman in any case so that he may become thoroughly familiar with the case before approaching the buyer.

Getting the Order

Following up the instance which we are using as an example, let us suppose that the salesman presents himself to the prospective customer, fully equipped with tool layouts, operation sheets, etc., for the pieces shown on the blue prints which he succeeded in obtaining on his former visit.

The customer is naturally attracted by the way in which the information is presented to him, and looks over the proposition with a great deal of interest. The tool layouts show him distinctly just how it is proposed to handle his work, and the information contained on the manufacturing summary sheet appeals to him because it is so complete. He makes the remark that he has received proposals from several other machine tool builders, but no information as complete as that which he now has before him. In one or two other cases, however, he says the time estimate is a trifle better, and the cost of equipment somewhat less. On examination, however, it is found that the other estimates take into consideration only the machining time, the other contingencies not being mentioned. Here the salesman points out the evident care which has been used by his sales engineer, to make the estimate as close to the mark as possible and yet to be conservative enough to be thoroughly practical. He calls attention to the ease with which replacements of worn or broken tools may be made and also how easy it is to adapt many of the tools to other work as occasion may require. And finally he makes mention of the adaptability of the machine itself to a great variety of other work such as the customer is constantly producing.

Although he has in the past had no business association with the firm which the salesman represents, the customer is so favorably impressed with the thoroughly practical suggestions of the sales engineer in connection with the time studies, tool layouts, etc., that he decides to invest in one of the machines, and finally closes the contract with a promised delivery of machine and tools four weeks later.

The Demonstrator

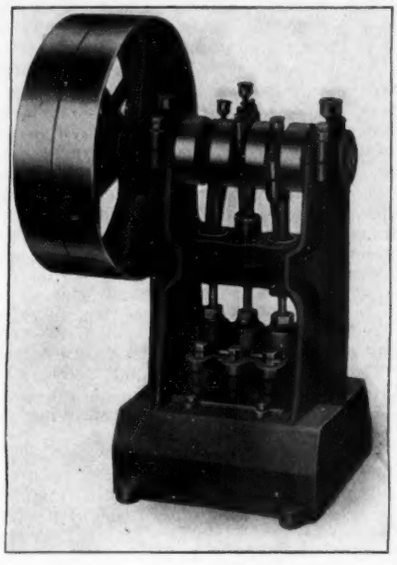
An agreement is made to send a demonstrator from the factory after the machine has been installed, in order to demonstrate its working and to instruct an operator in its handling, so that the purchaser may be enabled to get all the efficiency of which the machine is capable.

In this way then, the sales engineer has been of the greatest possible assistance both to the salesman and to the customer, for he has benefited the former by enabling him to interest the latter in the machine through the examples of work and time savings mentioned, and he is of service to the latter by giving him the benefit of a wide experience in handling work to the best advantage.

The Draeger Oxygen Apparatus Co., 422 First avenue, Pittsburgh, has issued an interesting circular explaining how pulmotors were used to save a great many lives in the big New York subway accident, Jan. 6. The circular also illustrates the pulmotor and its usual method of operation.

Small Hydraulic Pump

To meet the demand for a hydraulic pump delivering a small quantity of water, but still capable of exerting a high pressure, the pump shown in the accompanying illustration was designed by the Hydraulic Press Mfg. Co., Mt. Gilead, O. On account of its light weight it is claimed that this pump, when motor-driven, may be mounted on a truck and used as a portable pump for operating small hydraulic shop tools to which there is no pump attached. It is provided with a knockout attachment which automatically cuts off the delivery of water to the press ram, but holds the pressure thereon, when the pre-determined maximum is reached. A slight drop in the pressure automatically starts the flow which continues until the maximum pressure is again reached. The base of the pump forms a reservoir for the liquid used in this



VERTICAL HYDRAULIC PUMP

operation. The pump is built for either gear, chain or belt drive.

Centrifugal Coal Drier

A solution of the problem of removing moisture from coal and other material is offered in the Wendell continuous automatic drier, which is the invention of C. A. Wendell, experimental engineer, Illinois Steel Co., Joliet, Ill. The sole manufacturing and selling rights for this drier have been taken by the Link-Belt Co., Chicago, and a number have been installed, notable among them being a battery of three at the plant of the Woodward Iron Co., Woodward, Ala., as described in *The Iron Trade Review*,

FIG. 1—WENDELL CENTRIFUGAL COAL DRIER

Nov. 12, 1914. In this plant coal is taken from the elevators with 30 to 40 per cent of moisture and is delivered for use in by-product ovens with 8 per cent moisture.

The Wendell drier consists of three main parts, the frame, a pair of feed spouts and a container. There is also a discharge hopper for the dried coal and a sluice for the water which has been removed.

The feed spouts are fastened to the inner solid shaft and are driven by a transmission revolving at any desired speed independent of the retainer. The latter is conical and is driven at high speed by a shaft independent of the feed spouts. The outer inclined wall is perforated and the bottom is provided with openings closed by hinged doors. These are opened and closed automatically by cams attached to the shaft which carries the feed spouts. As the retainer gains slowly upon the cams, the difference in speed being slight, the dry material is automatically discharged, each door opening in turn. As the door closes, the spout following directly behind the cam fills the empty space in the retainer. The shape of the retainer and the effect

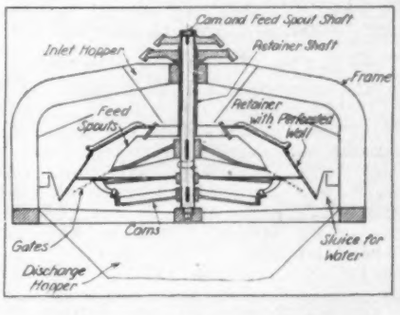


FIG. 2—SECTION OF WENDELL DRIER

of centrifugal force makes discharge instantaneous.

The Wendell drier automatically retains the material a predetermined definite time to remove the moisture to the degree deemed necessary. The entire performance is continuous and is accomplished by centrifugal force and gravity, no scraping or plowing devices being used.

The illustration shows one of the three driers in service at the Woodward Iron Co.'s plant and indicates their general construction. Although the device was designed primarily for removing mechanical moisture from coal, it is said to be equally efficient for other materials which contain more moisture than is desirable for efficient operation.

Electric Hoist

An improved type of electric hoist has been put on the market recently by the Link-Belt Co., Chicago. It is

HOIST FOR CLOSE HEADROOM

designed for exceptionally small head room, permitting its use in cases where only a hand-chain block can be employed usually. A sheet metal cover on each side encloses all parts. The covers are easily removed, giving access to the motor on one side and the hoisting drum and controller on the opposite side. The heads of the end housings can be taken off quickly, exposing the spur gears, which may be slipped off without disturbing the shafts.

It is said that a successful effort has been made to reduce the number of parts, which lowers maintenance charges. A splash system lubricates the cut steel gears; this renders less attention necessary than when grease cups are used. A dynamic braking system is used, the descending load driving the hoisting motor as a

generator and using it for a brake. The hoist is adapted for careful handling of the load, and thus is available for shifting flasks and ladles in foundries. A solenoid brake holds the load automatically when the current is shut off and even if this brake should become inoperative, the load would not fall but would descend slowly. This hoist is built in five forms, with either plain trolley, geared trolley, two forms of motor-driven trolley, or with a shackle or hook suspension for stationary service.

An interesting pamphlet on handling materials by means of grab buckets of various types has been issued by The Hayward Co., 50 Church St., New York. It contains a large number of illustrations showing installations of the Hayward equipment, handling coal, slag, rock, etc. The illustrations are accompanied by explanatory text matter.

If a drop of nitric acid be put on polished wrought iron or steel, the steel will turn black. The higher the carbon the blacker will be the spot.

Sparks From the Grinding Wheel

By H. O. Tair

My stars! It has been discovered that the planet Saturn is lopsided. Can this be one reason why some of our gloomy friends, evidently born under this malign planet's influence, saturninely refuse to see merit in the "Build Now" idea?

* * *

The readiness with which the European machine tool makers copy the American designs is, in a way, most complimentary. To return the compliment, let us more generally adopt the European "design' in selling and exploiting our manufactures in foreign countries.

* * *

Now and again, it comes to us that we are the originators of a very clever phrase, and, unless we are careful, we use it without thought of its application or its significance; it sounds "smart." Perhaps Secretary Redfield was caught napping in some such fashion when he emitted that "unintelligent competition" thing. It may be that the Secretary is so constantly occupied in ameliorating our trade conditions that he has no time to give sound thought to his lucubrations.

* * *

It would seem that the metal industry is longevity's long suit; the number of long-lived active men in its service is large. As an instance, William H. Hart is 80 years of age, and only recently did he retire after 60 years as the head of the Stanley Works at Hartford, Conn. There are many other notable examples.

* * *

Nasty things are being said of those workmen in England who are seriously embarrassing their government in its need for supplies during these trying times. What will be said of our workmen who are threatening to obstruct our industrial needs, and their own livelihood, by ill-advised strikes?

* * *

Opening the Dardanelles "may release large supplies of manganese ore from the Russian Caucasus," says a market report. Undoubtedly. The opening process now being practised by the Anglo-French fleet is already releasing large supplies of metal and the quantity being dropped on the Turks shows a remarkably short-time delivery and a large tonnage.

* * *

As a debtor nation, the United States has been a rather conspicuous example, but every week sets a new record for our export balance. There was an excess of $47,000,000 in the week of March 18. Can we keep this up?

* * *

A few years ago the average college professor seemed content to look forward to his "emeritus degree," and to sink out of sight and out of mind. Today, the "grind of the wheels" gets into the learned "prof's" blood; he soon pines for the whirr, the bustle, the grime. Like M. C. Maxwell, of the Yale & Towne Mfg. Co., he must give way to the call, forsake teaching the young idea how to shoot, and become one of us again.

* * *

Shall we welcome the motion picture, the "movie," in our midst? It has already been added to a few machinery salesmen's equipments. Reversing the usual proceeding, the factory has been brought to the prospect, the clicking little machine grinding out the pictured story of the product, beginning in the foundry and concluding f. o. b., all in a few brief minutes. Great psychology this, appealing to the senses through the eye —a sort of mechanical eye-opener.

* * *

When it become known in Sandusky that Doctor Rittman, of the Bureau of Mines, had discovered how to extract benzol from crude oil, the home folks cal'lated that they were mighty proud of "the Rittman kid." And he's a scientist! Are we never "grown-ups" to the neighbors of our boyhood?

* * *

And then there's Walter Allen, once a truck boy for the Yale & Towne Mfg. Co. Now he's its president. He became an expert toolmaker, then a draftsman, and kept climbing, onward and upward through all the executive rungs until he reached the top of the ladder. Once he was just "the Allen kid."

* * *

Kitchener says that the British unknown who sticks to his task at home is just as much a hero as the lad in the trench, and he's going to see that the workman gets a medal to prove it. Not to be outdone in the matter of awards, the Welsh tin plate makers have boosted matters by granting their men 5 to 7 per cent increases. Every little bit helps.

* * *

As a people we must be at one with the Sherman law in that "bigness" is not a crime. Our business undertakings are big, the machinery, the sales force, the consumers are big; our hearts are big, and our ideas and our ideals, our sturdiness, pluck and progress, and our room for the alien—big with purpose and achievement. And none of these things is a crime!

* * *

Now that the magnet has proved its practicability in removing metal embedded in the limbs and body, will some greatly needed genius come forward with a means for removing a thorn in the flesh?

* * *

"Automatic regulation," said a sorely tried shop manager recently, "is fine while it regulates, but sometimes I think there is only one regular way to get perfect automatic regulation: Some chap must invent a regulator to regulate the automatic regulator."

* * *

Based on calculation of radio-active phenomena, scientists declare that dear old Mother Earth has reached her 711 millionth birthday. Congratulations, Mother! You have given us bounteously of your substance for a long time back, although at times we have had to dig deep to get it. But we are grateful, and wish you an ever busy and useful life until the end of time.

* * *

They hated Count Witte in Russia because he insisted on administrative efficiency and economy, and pulled up a poor railroad to plant a good one. We don't hate anything in these United States except an imported "hate poem," but—well, we sorrow to see any railroad, unmindful of its deterioration, hesitate to mend its fences, in a manner of speaking, and build now!

Duplex Process at Maryland Works

Description of Plant and Methods—Unusual Conditions Encountered Owing to Necessity for Removal of Chromium From Iron

BY F. F. LINES

IT IS not the intention of the writer to enter into a discussion of the relative merits of the duplex process as compared with the straight scrap and pig iron process, working under the same conditions, but rather to present in a general way several modifications of the former process, and then describe the method adopted by the Maryland Steel Co., Sparrows Point, Md., as best suited to local conditions, and also to meet the metallurgical problem presented in the removal from the iron of an unusual constituent—chromium.

The principal factors to be considered in deciding, whether or not duplexing should be employed are:

1.—Chemical constituents of pig iron.
2.—Variety and quantity of steel to be produced.
3.—Relative cost of pig iron and scrap.
4.—Regularity of operation.
5.—Capital to be invested.
6.—An existing bessemer plant.

Having decided to adopt the duplex process, several combinations may be used, viz.:

1.—Acid-lined converter with basic open hearth.

A paper to be presented at San Francisco meeting of American Institute of Mining Engineers, September 1915. The author, F. F. Lines, is superintendent of the steel department, Maryland Steel Co.

2.—Acid-lined converter with electric furnace.
3.—Basic-lined converter with basic open hearth.
4.—Basic-lined converter with electric furnace.
5.—Basic open hearth with electric furnace.

The combination of an acid-lined converter with a basic open hearth furnace is the one most commonly employed, and as it is the one best adapted to the conditions encountered at the plant of the Maryland Steel Co., we will briefly outline the advantages and disadvantages of the different methods of working.

There are two general methods of blowing. In one, the charge is desiliconized and partly decarbonized in the converter. On account of the difficulty in regulating the percentage of carbon in the blown metal, this method is not desirable where the amount of phosphorus or other impurities to be removed is so low that the duration of the subsequent open hearth operation is determined by the time required to adjust the carbon to the specification limits. This objection, however, does not hold when the blown metal is to be added to a part charge of pig and scrap previously melted in the open hearth, or when it is to be treated by the continuous process in furnaces of 200 to 300 tons capacity. In the second method, the converter metal is completely desiliconized and the carbon blown down to about 0.10 per cent. This method of blowing commends itself on account of the regularity of the carbon content of the metal going into the open hearth furnace, and in certain cases the more complete removal of other constituents.

Two methods of charging the open hearth furnaces have been employed, dependent upon the facilities for handling the blown metal. In the first plants built it was necessary to send individual bessemer blows to the open hearth. However, in the plants built recently it has been found advisable to assemble the blows necessary for an entire open hearth heat in one ladle in the converting department. This method requires larger crane capacity, but has the great advantage of reducing the charging of the furnace to one operation. Both of these methods allow the slag to be kept out of the furnace. In deciding upon the most desirable size of an open hearth furnace, the question immediately arises as to the type—tilting or stationary; and as this discussion is limited to duplexing, where eight to 12 heats are tapped in 24 hours, there is little to be said in favor of the sta-

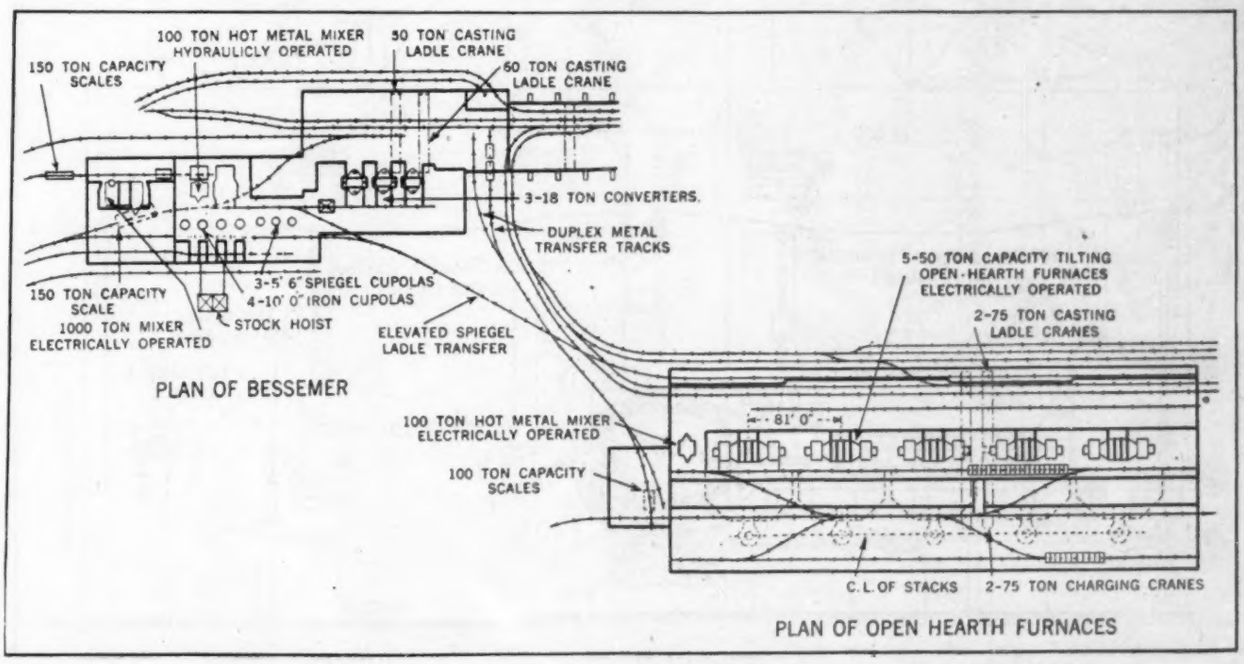

100 TON HOT METAL MIXER HYDRAULICLY OPERATED
50 TON CASTING LADLE CRANE
150 TON CAPACITY SCALES
60 TON CASTING LADLE CRANE
3-18 TON CONVERTERS.
DUPLEX METAL TRANSFER TRACKS
5-50 TON CAPACITY TILTING OPEN-HEARTH FURNACES ELECTRICALLY OPERATED
2-75 TON CASTING LADLE CRANES
150 TON CAPACITY SCALE
3-5' 6" SPIEGEL CUPOLAS
4-10' 0" IRON CUPOLAS
1000 TON MIXER ELECTRICALLY OPERATED
STOCK HOIST
ELEVATED SPIEGEL LADLE TRANSFER
PLAN OF BESSEMER
100 TON HOT METAL MIXER ELECTRICALLY OPERATED
81' 0"
100 TON CAPACITY SCALES
C.L. OF STACKS
2-75 TON CHARGING CRANES
PLAN OF OPEN HEARTH FURNACES

FIG. 1—GENERAL ARRANGEMENT OF CONVERTER AND OPEN HEARTH DEPARTMENTS OF MARYLAND STEEL CO., SPARROWS POINT, MD.

tionary furnace. Of late the tendency has been toward the installation of large tilting furnaces of 200 to 300 tons capacity, and while much of the evidence is contradictory, it can be safely stated that these larger furnaces show a saving in the cost of operation and repairs over the smaller ones. We are indebted to Dr. Schuster for a valuable paper read at the May, 1914, meeting of the British Iron and Steel Institute, in which he published the results obtained when working with different sizes and types of furnaces under identical conditions. As a result of experiments, covering a working period of 12 months, he has been able to establish conclusively that the quality of steel produced is both physically and chemically independent of the type of furnace employed; that the yield is practically the same whenever the same conditions are observed in furnaces of different types; that although the actual cost of the 200-ton furnace is higher than the cost of the tilting furnace of smaller capacity, or of a stationary open hearth furnace, this cost, calculated on the daily tonnage produced, works out most favorably for the 200-ton furnace; that the fuel consumption is lower in the 200-ton furnace than in the other furnaces; that the life of the refractory lining is longer in the 200-ton furnaces and that the labor of operating is less in the 200-ton furnace.

At the plant to be described, the following points decided the adoption of the duplex process: This plant was

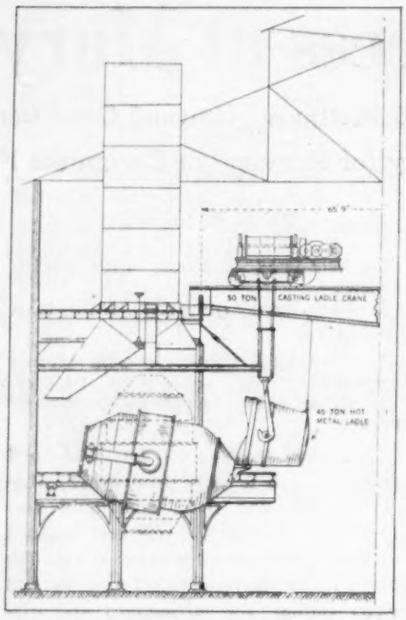


FIG. 2 — SECTIONAL VIEW SHOWING METHOD OF CHARGING CONVERTERS

built originally to manufacture bessemer steel rails, the blast furnaces and steel department being proportioned accordingly; the soaking pits in the rail mill were designed to treat the steady stream of hot ingots produced by the bessemer process. To be able to supply open hearth steel in place of bessemer steel, the duplex process was adopted, using five 50-ton tilting furnaces, emptied at each heat. It was also decided at the start to blow the iron to about 10 per cent carbon and to assemble the converter charges required for an open hearth heat in a single ladle in the converting department.

The advantages of this plan for this plant are:

1.—Low first cost and no changes necessary in the existing plant.
2.—The ability to produce all bessemer steel or all open hearth steel, with very little change in the volume of finished product.
3.—The blast furnaces may be run to the best advantage, as no limit is set in regard to the silicon of the metal delivered to the converters.
4.—The change to duplex or to straight bessemer steel is made without expense or loss of time.
5.—When working on open hearth steel, the bessemer department is fully employed.

The converting plant, built in 1889, the general arrangement of which with respect to the open hearth is shown in Fig. 1, is contained in one building. At the south end of the building is a 1,000-ton, cylindrical, electrically operated metal mixer. The iron from the blast furnaces comes to the mixer building in 45-ton ladles. A crane of 75 tons capacity, with an auxiliary 10-ton hoist for tipping the ladles, is used for handling the iron. The iron ladles coming from the blast furnaces are weighed on 150-ton standard-gage track scales. Coke-oven gas or fuel oil is used for heating the mixer, a burner being arranged at each end for this purpose. However, it

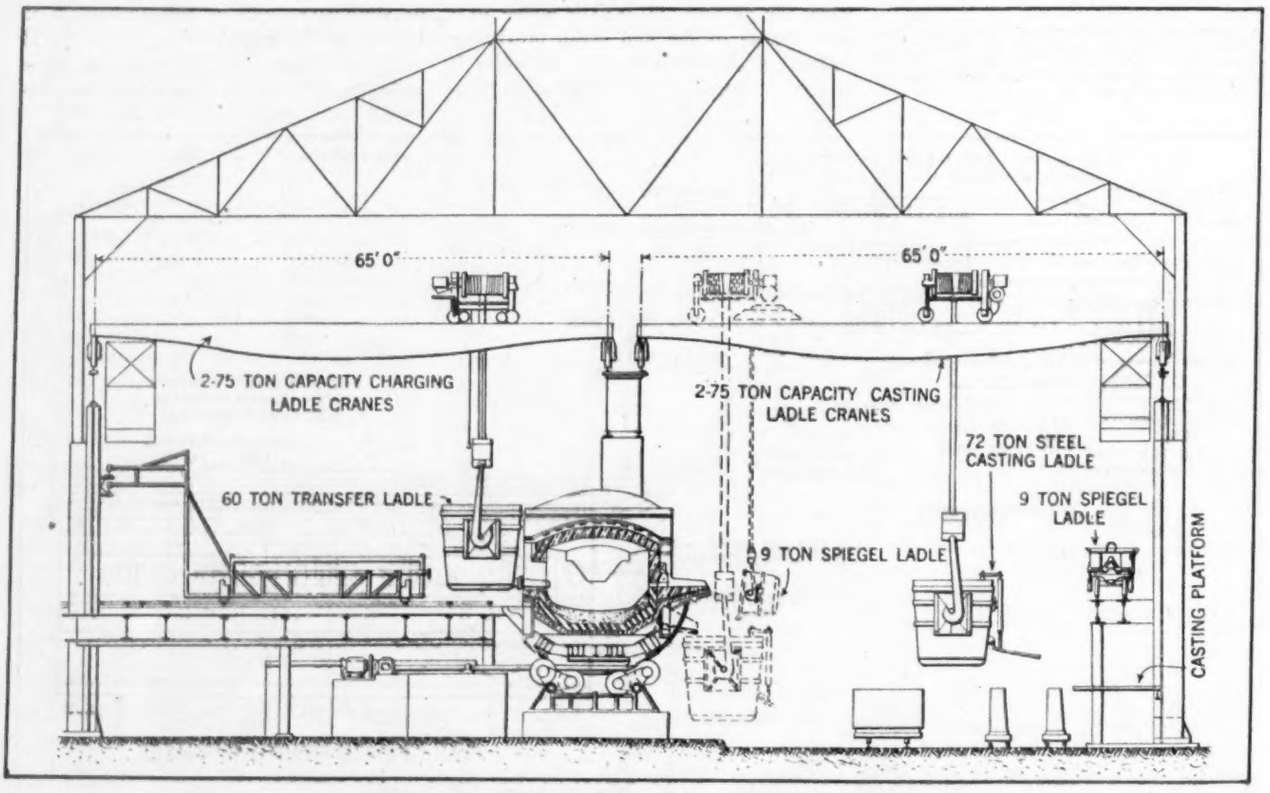


FIG. 3—SECTION OF THE OPEN HEARTH PLANT

has been found necessary to use only one burner and the mixer has been kept in excellent condition by the use of 100,000 cubic feet of gas in 24 hours. The mixer has a 9-inch magnesite lining, backed up by 13 inches of fireclay brick. Directly under the pouring spout is another standard-gage track scale for weighing the metal charges for the converter. From the mixer, the molten metal is taken to the casting side of the converters. On its way it passes under the iron cupola runners, where it may be stopped to receive an addition of cupola metal. The converters are served by two traveling cranes, one with a 50-ton ladle hoist, having a 5-ton auxiliary hoist for pouring the iron into the converters, and the other, a 75-ton crane which takes the blown metal from the converters.

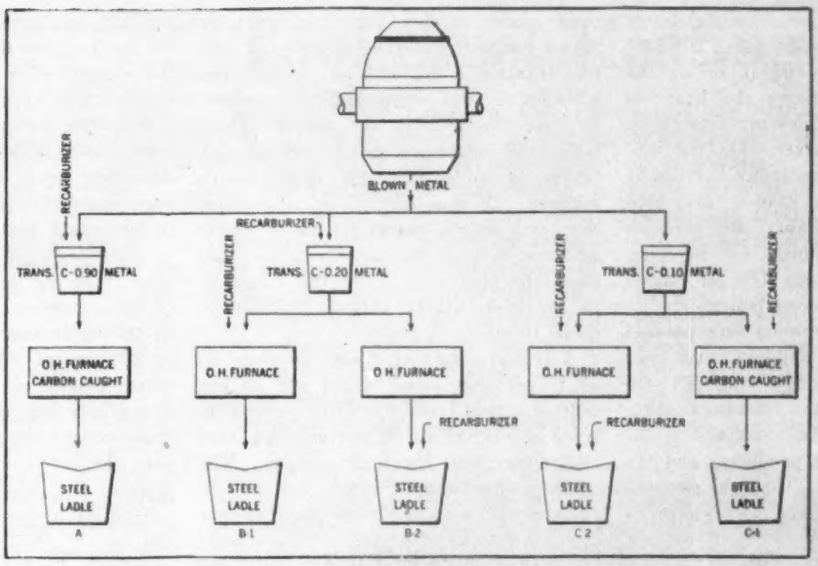


FIG. 4—CHART SHOWING DIFFERENT POSSIBLE METHODS OF DUPLEXING

The method of pouring the iron into the converters is shown in Fig. 2. The three converters are of the concentric type, of 18 tons rated capacity, but 20 to 22 tons of metal have been repeatedly blown. The converters, operated by hydraulic cylinders, are mounted on structural-steel columns and are spaced on 33-foot centers. The converter bottoms have 24 tuyeres, each tuyere having eight $\frac{5}{16}$-inch holes, giving a total effective area of 47 square inches per bottom. With 21 tons of metal, the depth of the bath is 24 inches. The blown metal from these three converters is received is a 60-ton transfer ladle, which is conveyed by a motor car to the open hearth, a distance of 350 feet. The ladle is carried to the proper furnace by one of the 75-ton charging cranes, and placed in position, as shown in Fig. 3. This type of transfer ladle differs from those in general use for this purpose, in that the metal is not poured over the top of the ladle into the furnace, but is tapped through a 3-inch nozzle placed on the side.

The open hearth building is 459 feet long, and 138 feet wide, there being a 65-foot clearance on the pit side of the furnaces and 65 feet on the charging side. On the latter side there are two 75-ton electric traveling ladle cranes for handling hot metal and duplex metal on the charging floor, and a 10-ton charging machine. A 120-ton metal mixer is placed in line with the furnaces, and is

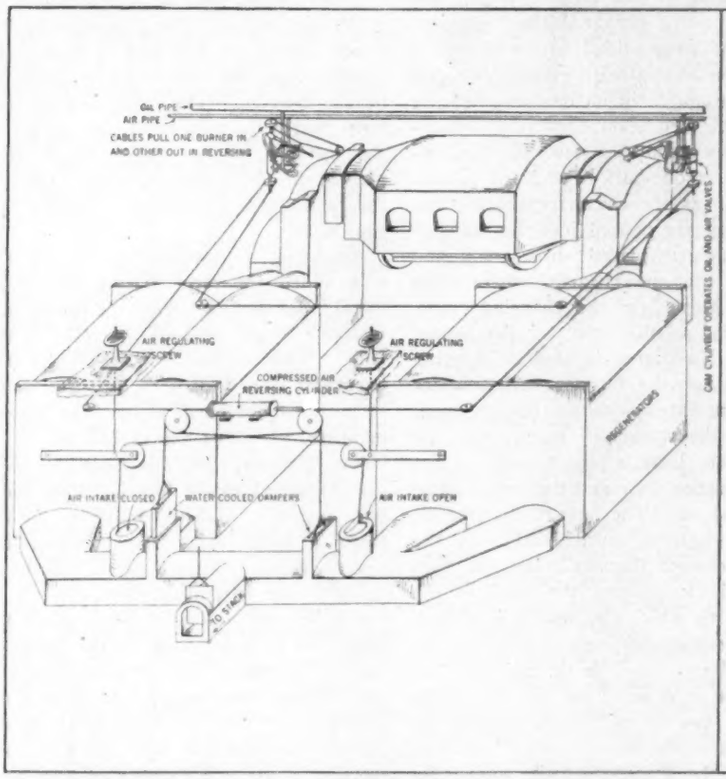


FIG. 5—OPEN HEARTH FURNACE REMODELED TO BURN OIL

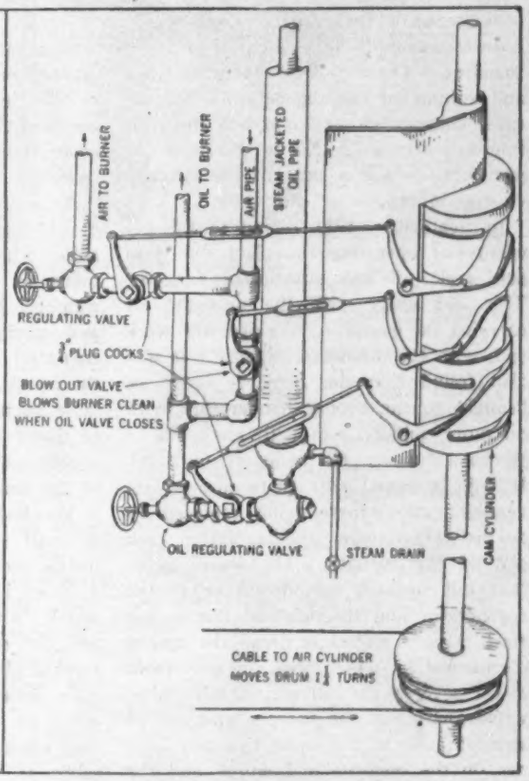


FIG. 6—HOW OPERATION OF OIL BURNERS IS CONTROLLED

so arranged that the metal can be drawn out on the charging side as a "fill out" for dead soft duplex metal, or on the pit side for recarburizing the heats in the casting ladle. Scales are located on both sides of this mixer. On the tapping, or pit side, 75-ton ladles, handled by two 75-ton traveling cranes, are provided. The ladle cranes are supplied with two auxiliary hoists for handling the recarburizing metal. The pit slag is handled in steam-dumping ladles.

The gas-producer building runs parallel to the open hearth building, and contains nine self-cleaning, Hughes producers, as well as two dolomite kilns, and one crusher. The stockyard is located between the gas producers and the open hearth building. The cold stock is loaded on a stock platform, adjacent to the charging floor, by a 10-ton magnet crane, which fills the boxes on the ground level from standard-gage cars.

The dimensions of the furnaces are: Length between chill plates, 31 feet 2 inches; length on the metal line, 24 feet, and width on the metal line, 11 feet 6 inches.

The actual area on the metal line is 175 square feet, when made up to hold 50 tons. This area generally averages 220 square feet and with this 60-ton heats are tapped. The gas regenerators are 8 feet 3 inches x 22 feet x 10 feet 4 inches, containing 1,815 cubic feet. The air regenerators are 13 feet 3 inches x 22 feet x 10 feet 4 inches, containing 2,915 cubic feet. It will be noted that the dimensions of these furnaces and regenerators are small as compared to most furnaces. The ratios of the bath area and volume of the regenerators per ton rated capacity closely approach the continuous furnace of 200 to 300 tons capacity, in which a part of the furnace charge is tapped at one time.

In September, 1913, owing to the necessity of operating the plant five days per week, oil was substituted for gas. This did away with the necessity of carrying the gas producers over the week end, with the attendant expense. It was also found that the furnaces could be brought to the proper temperature with oil more quickly than with gas. Fig. 5 shows a furnace remodeled to burn oil. It will be noted that there are no reversing valves, these being replaced by an ordinary damper and air lid in each end of the furnace. The waste gases pass out through one downtake to the regenerator and through one flue to the stack. Fig. 6 shows in detail the special mechanism by which with one movement at the reversal, the burner on one end is withdrawn from the furnace and the oil shut off, and at the same time the burner on the opposite end enters and the oil is turned on.

For one duplex heat or one complete open hearth furnace charge, three fully blown converter charges are poured into one transfer ladle, with or without the addition of iron in the ladle for carbon. In case the iron is not added in the ladle, the necessary carbon for proper action is added in the open hearth furnace. By this method of assembling the open hearth charge of blown metal into one ladle in the bessemer, the complete charging time from the bessemer to the open hearth furnace is brought down to about 25 minutes.

A typical converter charge is made up of 75 per cent mixer metal and 25 per cent of cupola metal, the latter ordinarily being a mixture of 70 per cent pig iron and 30 per cent rough steel scrap. The direct iron, containing silicon, 0.40 to 1.50 per cent; manganese, 0.70 to 0.90 per cent; phosphorus, 0.055 to 0.065 per cent; chromium, 1.75 to 2.50 per cent, and sulphur, 0.01 to 0.10 per cent, is poured from the mixer into 45-ton ladles, and the cupola metal is added in the same ladle. This ladle makes two trips to charge the three converters. On the first trip two converters are charged, both of which start blowing at once. On the second trip, the third converter is charged. By handling the iron in this manner, a minimum skulling of the ladle is obtained. The temperature during the blow is controlled by charging from 4 to 8 per cent of bloom crops or rail ends through scrap chutes into the converters. This, with the scrap in the cupola metal, gives a total of 14 per cent of scrap in the charge. The high percentage of scrap added to the charge is allowed on account of the heat developed by the chromium in its oxidation during the blow. From our practical experience, it is estimated that its heat of oxidation is one-half of that of silicon.

As soon as the converter charges are blown they are poured into the transfer ladle, which is placed on a truck and taken to the open hearth, where it is weighed, hoisted by the charging crane, and carried to the front of the proper furnace. No runner is used in charging the metal into the furnace, each transfer ladle being fitted with an 18-inch spout to direct the stream of metal from the nozzle. The ladle is placed within 2 feet of the furnace door and the nozzle plate is knocked off. The helper, standing on a small platform on a level with the nozzle, picks out the small clay plug with a short hook, loosens the sand in the nozzle, with which the nozzle is closed, and the stream of metal spurts out at right angles to the ladle through the furnace door. As soon as all the blown metal has run out of the nozzle, and the slag appears, the ladle is tilted back and taken to the transfer truck, where the slag contents are dumped into standard-gage steam-dumping slag bowls, and the ladle is light-weighed. The slag in the bowl is also weighed, and in this way the weight of the metal going into the furnace is established.

The time for running a heat from the ladle varies with the size of the nozzle, depending upon how many heats have been made through the same nozzle. It is the usual practice to take from six to eight heats off each nozzle. The total time from the pouring of the metal out of the converter nose to transferring all to the open hearth furnace is from 22 to 28 minutes. There are few cases in which trouble is encountered in opening the nozzle on the transfer ladle. If trouble does occur, the metal is poured over the top of the ladle, or in case of steel in the nozzle, it is opened with a stream of oxygen. When pouring over the top of the ladle considerable acid-converter slag is carried into the furnace which interferes with the removal of the phosphorus and requires large lime additions for neutralizing.

Before charging, a mixture of 1 to 2 per cent of burnt lime and 1¼ per cent of roll scale is put on the bottom. It is desirable that the lime and scale have sufficient time to become thoroughly cut up before the duplex metal goes into the furnace. The time elapsing between tapping of one heat and charging the next varies from 20 to 60 minutes, the average being about 30 minutes. As soon as the duplex metal is in the furnace, a test is taken and sent to the laboratory, where the carbon is determined by direct combustion. The time elapsing between taking the test and obtaining the results from the laboratory is from 20 to 25 minutes. The treatment in the open hearth depends upon the carbon in the metal from the converters, as explained in the following description of the individual methods, outlined in Fig. 4.

According to method *A*, Fig. 4, the iron added for recarburizing the blown metal is taken direct from the mixer, and is about 20 per cent of the total in the ladle. This method requires, with the particular iron dealt with, that the blown metal must not finish at too high a temperature, nor must the carbon be blown below 0.08 per cent, otherwise, in addition to an excessive blowing loss, there will result a violent ebullition in the transfer ladle when the recarburizing iron is added. This results in a mechanical loss due to boiling over the top of the ladle, and a loss in skulling of the ladle due to a lowering of the temperature of the steel. An advantage claimed for recarburizing in the ladle is that the addition of iron to the ladle reduces some iron from the slag back into the metal. However, a number of tests have been made on this point, and they do not show any appreciable reduction of FeO

in the converter slag. The figures are as follows:

	Slag from converter, per cent.	Slag in transfer ladle after iron added, per cent.
SiO_2	22.80	24.60
FeO	24.16	22.60
MnO	7.70	7.00
Cr_2O_3	27.65	26.10

We now have in the converter or transfer ladle 60 tons of metal of the following composition:

	Per Cent.
Carbon	0.70 to 0.90
Manganese	0.10
Phosphorus	0.065
Sulphur	0.040
Chromium	0.30 to 0.35

The metal as soon as it goes into the open hearth furnace begins to take action. The metal loses about ten points carbon and the phosphorus is down to 0.008 to 0.02 per cent in the first test; the heat is, chemically, ready to tap. In the meantime, if the temperature of the bath is sufficient to go out on the first test, the melter has the tap hole open, the ladle hung, and if the analysis of the preliminary is within the limits the heat is tapped. In case the bath is not of the proper temperature, or the carbon too high, another test is already being worked by the laboratory, as the helper takes a test out of the furnace every 20 minutes. On receipt of the second result, if within the limits, the heat is tapped. The manganese, with this method, is generally added in the ladle, as well as the 50 per cent ferro-silicon. If 11 per cent ferro-silicon is used, it is added in the furnace 5 minutes before tapping. A great many heats are of sufficient temperature to carry cold spiegel, added in the furnace 5 minutes before tapping. Forty-five minutes is a good average time from charging metal into the furnace to tapping, and there is no doubt that this method has the advantage of rapidity and ease of operation, there being no further metal additions to the furnace, with their attendant delays and boiling effects in the future. The disadvantage of this method is that the time necessary to determine the carbon in the sample is of such duration that by the time the results are known the metal in the furnace has not the composition it had when the test was taken, and as the carbon does not drop uniformly, heats are tapped from time to time which do not come within the prescribed carbon limits for rail steel. This is of particular importance to this plant, as we have no other product into which heats unsuitable for rails can be rolled.

In practice, methods *B*-1 and *B*-2, Fig. 4, were found to give unsatisfactory results, due to the metal skulling in the transfer ladle, and the fact that the small percentage of carbon often boiled out in

(*Continued on page* 696b.)

Tool Steel Heating Forge

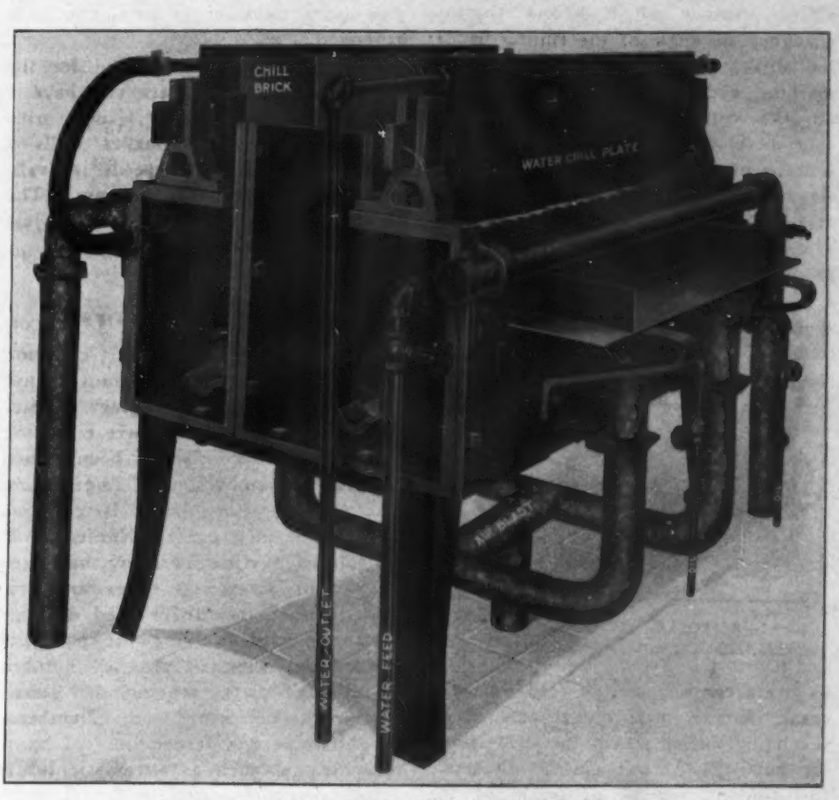
A HEATING forge for tool and drill steel, designed to operate with oil or gas, has been developed by the Monarch Engineering & Mfg. Co., Baltimore. This forge, which is shown in the accompanying illustration, will operate on any air pressure desired. Low pressure is preferable but it is said the forge may be connected to a high pressure line. It is designed to meet the requirements of mines, smelters and manufacturing plants.

All plates are joined together with an outside flange in order to minimize cutting the brick. Through the arrangement of the bricks in the lower chill, it is claimed that they cannot become disarranged while the forge is in operation, and that the bricks can be replaced readily without interfering with the other parts of the forge.

The top or arch of the forge is designed to act as a retainer for the brick forming the arch over the heating chamber and at the same time protect the operator. This top is adjustable in order to obtain any desired length of heat within the capacity of the furnace. By this arrangement, it is claimed that iron and steel products of any diameter can be heated by raising or lowering the top to the height required for the entrance of the blanks. The beveled arrangement of this top is claimed to permit the heating of blanks as short as ½-inch in length as rapidly as those of larger size.

The forge is built in two sizes. The details and specifications for the larger size are as follows:

Width, in.	50½
Height, floor to top, in.	42
Depth, in.	35
Depth, inside combst. chamber, in.	5
Mouth opening, wide, in.	36
Mouth opening, high, in.	3
Weight, lbs.	4,000
Oil per hour, gal.	4 to 5
Fire chambers, in.	35 x 16 x 16
Thickness lining, brick, in.	7
Thickness inner lining, asbestos, in.	½



HEATING FORGE FOR TOOL STEEL

Approves Elastic Limit Requirements

The American Railway Engineering Association approved the addition of an elastic limit requirement to its specifications for structural steel for bridges at its meeting in Chicago recently. The details of the proposed change in the specifications were published in full in the March 18 issue of *The Iron Trade Review*, pages 571 and 572.

The Cleveland Twist Drill Co., Cleveland, has issued an attractive folder under the heading of "Save Your Money by Saving Your Drills". The folder illustrates and describes the double tang sockets made by the Cleveland Twist Drill Co.

New Drill Fluting Machine

A NEW type of drill fluting machine, shown in the accompanying illustrations, has been put on the market by the Bickford Machine Co., Greenfield, Mass. The machine is said to be fully automatic for both the forward and return movements of the carriage, as well as for indexing between the two flutes of the drill.

The angle between the cutter spindle and the direction of travel of the carriage is constant, a special device providing increase of lead and thereby changing the angle of the cutting lip of the drill. As shown in Fig. 1, the machine is driven by a pulley mounted on the cutter spindle, and, through spur, bevel and worm gears, the power is transmitted to a crank shaft. The latter carries a crank wheel which actuates the carriage through an L-shaped arm, as shown in the illustration. The peculiar shape of this arm is necessary

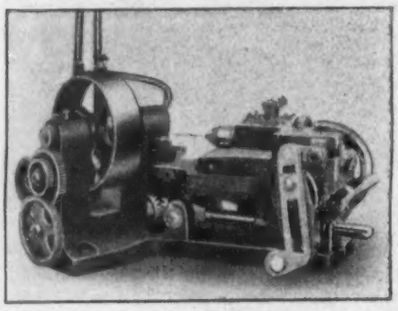


FIG. 1—AUTOMATIC DRILL FLUTING MACHINE, SHOWING DRIVE

to give a constant rate of feed when the crank shaft is making that part of its revolution during which the drill is being cut. The crank pin is adjustable for different lengths of travel of the carriage.

Fig. 2 shows the mechanism for obtaining the spiral movement and the increase twist. The drill or work spindle is spur geared to a shaft carrying a bevel pinion, which, in turn, is in mesh with a bevel gear mounted on the side of the carriage. This bevel gear is revolved by a slotted arm which gets its motion, as the carriage moves forward, by contact with a small roller adjustably attached to the frame of the machine. The ratio of the gears is such that a movement of 45 degrees of the slotted arm will give 1¼ revolutions of the drill spindle, which is sufficient to give the spiral to the drill.

The upper end of the swinging arm carries a short shaft, on one end of which is a rectangular button and on the other a disc with four pins, so arranged that each time the carriage returns, this button is given a quarter turn by a latch in the top of the carriage. Thus the button presents first a side and then an end to a block on the bevel gear. This gear is arranged to stop at a certain position as the carriage comes back, and the button picks it up on its forward movement. The difference in position between a contact of the side and a contact of the end of the button is equal to half of one revolution of the drill spindle. Fig. 2 shows the carriage in position just as the button has made its quarter turn and is ready to pick up the block on the bevel gear with its end.

These machines are designed for the use of high speed cutters and have a productive capacity of 30 ¼-inch drills per hour each. For smaller drills a range of five different speeds is available by means of change gears. The machine illustrated is one of six just completed for export.

Steam Hammers

An exhaustive catalog covering steam hammers, drop hammers, hydraulic forging and flanging presses, riveters, accumulators, power trimming presses, etc., recently has been issued by the Chambersburg Engineering Co., Chambersburg, Pa. It contains 64 8½ x 11-inch pages. Numerous illustrations of Chambersburg hammers of various sizes and types are presented, together with detailed descriptions and tables giving the principal dimensions, weights, etc. A number of full-page plates are included showing work performed on Chambersburg hammers. Descriptions of hammer fittings, such as automatic lubricators, piston rods, piston rings, throttle control levers, etc., are presented. Several pages are devoted to instructions on the care and operation of steam hammers of various types.

New Engine Lathe

The Cincinnati Iron & Steel Co., Cincinnati, has placed upon the market an 18-inch engine lathe which has several new features. The bed is of semi-steel. The head stock is of massive construction, thoroughly ribbed throughout. The bearings in the head are of phosphor bronze. The carriage is heavy, with long bearings on the ways, and has a wide bridge. All feed and thread changes are made instantly without removing any gears or stopping the lathe. The gears are of steel, cut from the solid bar. Changes of feed can be obtained by the use of one lever. The lead screw is reversed at the head of the lathe and a safety device is provided between the feeds and the lead screw, making it impossible to engage but one at a time. When the upper pull pin is in a neutral position, all gears are thrown out, which is especially desirable for high speed work. The apron is of the double plate type with a back support to the studs.

Feeds are obtained by means of a multiple pitch steel worm and a bronze worm wheel running in oil tending to insure smooth feeding. Both longitudinal and cross feeds are independent of each other. They are obtained through the same friction and can be reversed in the apron. When the screw is disengaged, half nuts are automatically locked, eliminating the possibility of their accidentally engaging the screw. Both the cross feed and the top slide screw are provided with micrometer graduations and the swivel slide is graduated on each side.

The countershaft is of the double friction type with self-oiling journals.

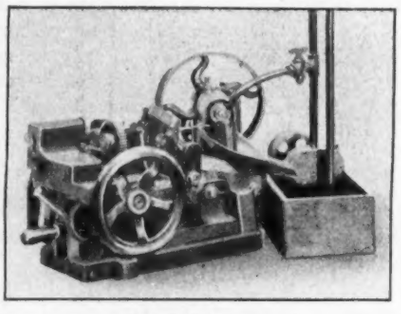


FIG. 2—MECHANISM FOR OBTAINING SPIRAL MOVEMENT AND INCREASE TWIST

The hangers are of pressed steel with ring oiling boxes. The reverse plate and all gears are of steel. The double back gear has a three-step cone. A variable speed motor is used, direct connected for either direct or alternating current. Following are the principal dimensions of the lathe:

Swings over Vs, in.	19½
Swings over carriage, in.	13¼
Takes between centers	29
Front bearing, in.	3½ x 5¾
Back bearing, in.	3 x 4½
Nose of spindle, in.	3 x 2⅜
No. threads on nose of spdl., per in.	5
Spindle center (Morse)	No. 4
Diameter steps on head cone, in.	13–11–9
Width of belt on head cone, in.	3½
Number of steps on head cone	3
Back gears proportioned	10 to 1; 3.17 to 1
Threads on lead screw	4
Diameter lead screw, in.	1⅝
Threads will cut per in.	2 to 46
Range of feed per in.	8 to 184
Changes of feed	38
Length of head stock at base, in.	29
Length of tail stock at base, ins.	14
Diameter of tail stock spindle, in.	2¾
Travel of tail stock spindle, in.	9
Depth of bed, in.	13½
Width of bed at top, in.	16½
Length of carriage, in.	28½
Width of carriage bridge, in.	7¾
Diameter of large face plate, in.	18½
Diameter of small face plate, in.	10¾
Countershaft pulleys, in.	12 x 4½
Speed of countershaft	100 to 140
Size of cutting tool, max. size, in.	¾ x 1½
Horsepower required	5

Welding Shafts on Special Machine

How a Butt-Welder is Used to Weld 40-Foot Rods Where Accurate Alignment is Imperative

Fig. 1—Shaft Welded on a Butt-Type Welding Machine

AN ELECTRIC welding machine which presents a number of interesting features has been designed for the Saco-Lowell Shops, Biddeford, Me. In the spinning machines manufactured in this plant, it is necessary to provide shafting which varies from ¾-inch to 1½-inch in diameter and is from 30 to 40 feet long. It was found difficult to turn and grind these shafts with the exactness required, in lengths exceeding two feet. The method formerly pursued was to drill and tap the ends. Thread pins then were inserted to hold the pieces together. It was found impossible by this method to make a 40-foot bar which was in exact alignment or which had the requisite strength.

The Toledo Electric Welder Co., Cincinnati, was commissioned to build an electric welding machine to weld these rods together. The specifications called for a 40-foot rod to be in alignment and concentric within 0.004-inch. The difficulty in building such a machine can be realized when it is recalled that a variation of 0.001 or 0.002-inch in the line-up of the welder, or the slightest spring or give in the body of the machine, would throw it out enough to cause its rejection. The machine shown in Fig. 2 was built after being accurately lined up and on its first test, it is said rods were made which more than fulfilled the specifications. The weld is shown at *W*, Fig. 1. This accuracy is obtained by making the clamping mechanism so massive that there is no perceptible spring in any part after the pieces are clamped in place and the necessary pressure applied to force the stock together.

Copper dies of the floating type are used to convey the current to the rods. These dies are brought up to the work after the stock is clamped into position to avoid throwing the pieces out of alignment. The ends of the rods are brought to a welding temperature in about 15 seconds after the current is turned on. A pumping motion on the lever handle shown in front of the machine, Fig. 2, operates a 5-ton hydraulic ram that forces the ends of the semi-molten stock into each other and gives the weld. The dies are then withdrawn from the rods, the clamps which hold the stock are released and the operator is ready to make the next weld. The clamping of the stock and the actual welding is done in from 50 to 60 seconds and the complete bar is concentric its entire length within 0.002 to 0.003-inch. The flash left on the stock where the weld is made then is turned off in a lathe.

There are four of the floating copper dies, so arranged as to avoid any strain upon the stock which would tend to move it out of alignment. The stock is clamped at two points by steel clamping dies in order to secure correct alignment. These clamps are adjustable the whole length of the slide. The slides operate in V-ways with adjustable tapered gibs for taking up wear. The copper dies are 1¼ inches thick, 2¾ inches wide and 1½ inches long. The steel dies are 1¼ inches thick, 2½ inches wide and 1½ inches long. The maximum die opening is 3½ inches. The length of the right slide is 31 inches, and of the left slide 20 inches.

The maximum power required for actuating the machine is 57½ horsepower. The height from floor to center of dies is 35½ inches. The floor space required is 29 x 80 inches, while the shipping weight of the welder is 7,500 pounds. The hydraulic ram is furnished with a foot-operated pedestal switch.

Hess & Son, 1033 Chestnut street, Philadelphia, have developed a pocket screwdriver, which is about the size of a quarter. It is made of steel and has a taper rim which enables it to fit any ordinary size screw.

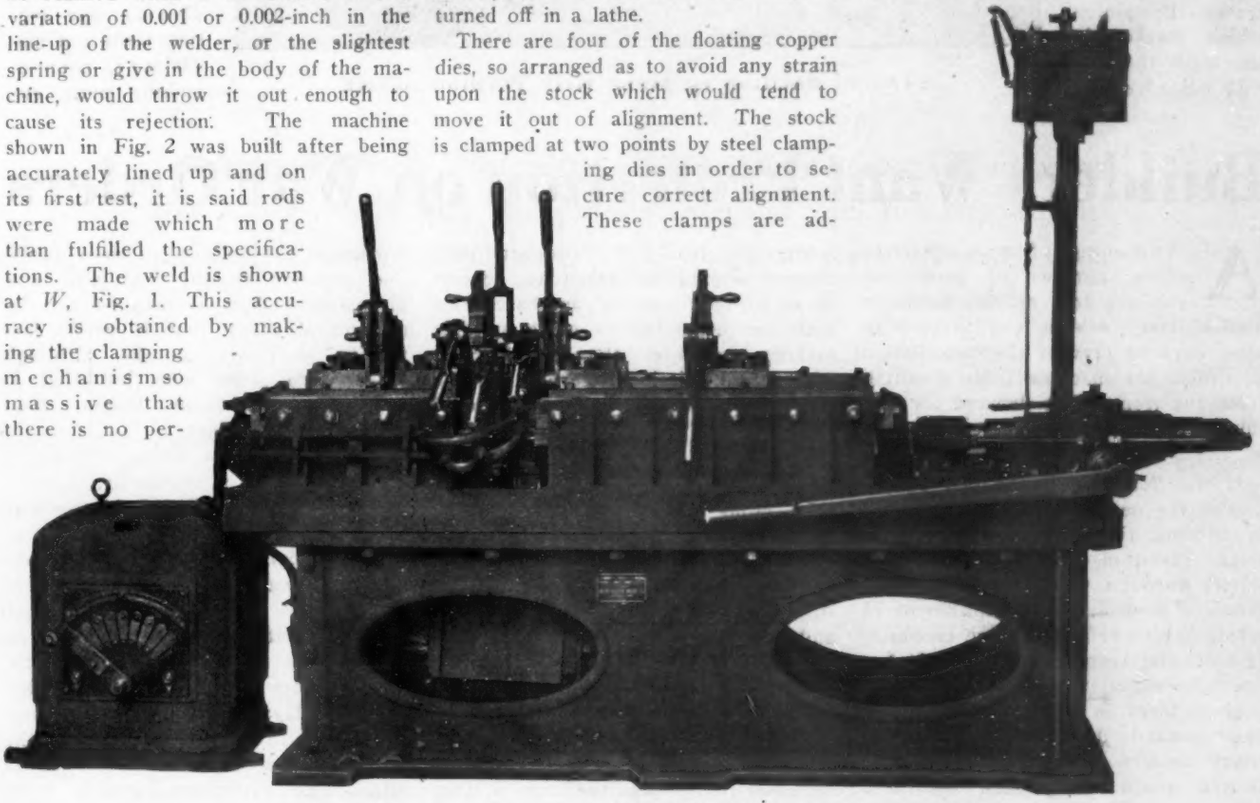
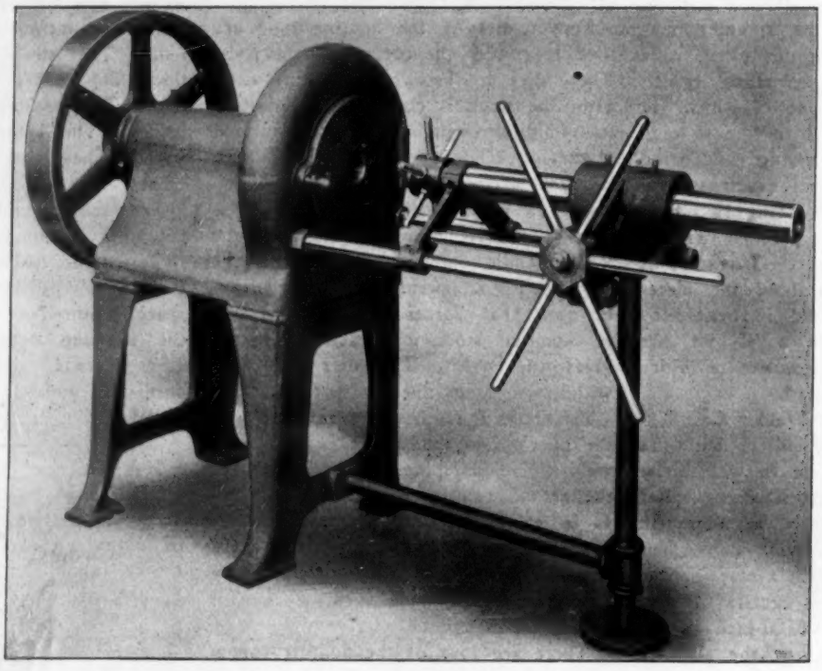


FIG. 2—BUTT-WELDER DESIGNED FOR WELDING 40-FOOT SHAFTING

New Feeding Device for Swaging Machine

A NEW feeding device for rotary swaging machines recently has been brought out by the Standard Machinery Co., Auburn, R. I. The attachment is used in feeding in long bars of tubing or rods of either steel, copper or iron, for reducing the entire length of the bar or swaging any part of it.

The large spanner wheel shown at the extreme right of the accompanying illustration is used for feeding-in the spindle of the attachment. The spanner wheel shown in the center on the spindle operates over a spring collet with a conical nose. The bar is put through from the rear of the spindle shown at the extreme right, and is clamped tightly by the chuck on the opposite end of the spindle, which is controlled by the spanner. The large spanner wheel operates the pinion which meshes in the teeth that are cut on the under side of the spindle. The feeding device is bolted to the front of the machine and is supported by a pipe stand. Attached to the front end of the spindle is a steel bracket. The two lower bushings on this bracket ride along the two rods which are bolted to the front of the machine and serve as a guide and support for the spindle as well as keeping it in alignment. The rear part of the attachment consists of another steel casting where the shaft, on which the spur pinion is placed, has a bearing. The spindle rides in a bronze bearing in this casting.



SWAGING MACHINE EQUIPPED WITH FEEDING DEVICE

It is claimed for this feeding device that it can be used not only for reducing brass, bronze and steel tubing, but also for the swaging of special steel forms, such as trolley poles, automobile axles and steel tubing of special shapes.

"Faessler Boiler Makers' Tools" is the name of a new catalog just issued by the J. Faessler Mfg. Co., Moberly, Mo., specialist in boiler tool manufacture. This catalog fully illustrates and describes many types and sizes of boiler tube and superheater flue expanders, both sectional and roller, for hand or power operation. It also shows flue cutting tools and machines, countersinking tools, etc.

Builders Want Protection on War Orders

AT A meeting of representatives of a number of prominent machine tool manufacturers in Buffalo last week, it was decided to take steps to prevent the cancellation of orders for machine tools resulting from the tremendous demand for war munitions by the belligerent powers of Europe.

It was felt that if the war should end in the near future or unexpectedly at any time, a serious situation might result in the machine tool industry through the wholesale cancellation of orders, in the fulfillment of which the manufacturers are constantly incurring large obligations. It has been the experience of many machine tool builders in the past that when the demand dropped off suddenly, many dealers who had placed large orders would cancel their contracts.

It was the consensus of the Buffalo conference that the European purchasers should be asked to deposit all or a portion of the purchase price with the order, or in some suitable manner guarantee the manufacturer against cancellation. Several of the manufacturers decided that they would communicate with their dealers in Europe and endeavor to have the orders made uncancellable.

In lathe manufacture, particularly, the business is somewhat precarious because most of the tools which are ordered have short beds and many of them are fitted with profiling fixtures and other features which are not readily salable. Inasmuch as the manufacturers are sold up for four or five months in advance and are obliged to purchase material to cover their contracts, it can readily be understood that a cancellation of a large number of orders would be very disastrous to the builders of these tools. The duration of the war also was discussed, and it seemed to be the opinion of many that it would last for at least six months, although there were some who felt that it could not continue longer than through the summer.

It is said that a 1½-ton truck manufactured by the Kissel Motor Car Co., Hartford, Wis., in the service of an industrial establishment in Oakland, Cal., was struck by a locomotive and thrown 25 feet without serious injury to either its power plant or frame. The truck was repaired without difficulty and was running again in a few days. The first Kissel truck was built in 1909. At present the Kissel company builds trucks in six sizes with capacities ranging from 1,500 pounds to six tons.

The Exhibit

of the

United States Steel Corporation

at the

Panama-Pacific Exposition, San Francisco

A Series of Twelve Illustrations, Showing Many Features of a Display that Covers the Entire Scope of the Iron and Steel Industry, Supplementing a Description Published in The Iron Trade Review, Feb. 11, 1915.

Supplement to The Iron Trade Review, April 1, 1915.

Fig. 1—General View of United States Steel Corporation's Exhibit at the Panama-Pacific International Exposition, San Francisco.

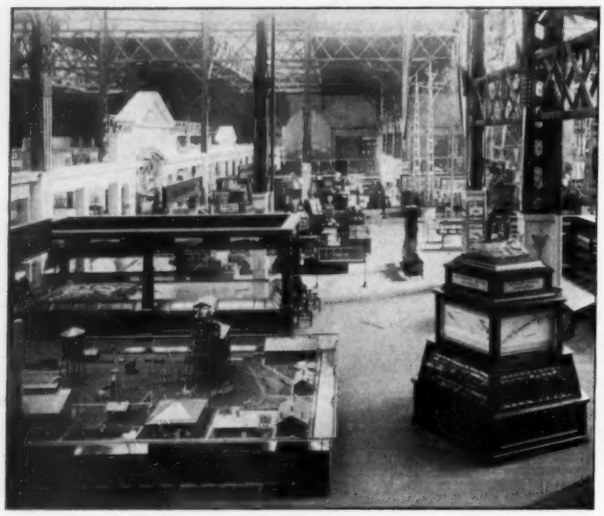


Fig. 2—In the Foreground is a Model of a Modern Coal and Coke Plant, While Immediately Behind it is a Model of Conneaut Harbor, Showing Ore Vessels Entering and Leaving the Harbor, Illustrating the Unloading of Ore and the Loading of Coal and Rails

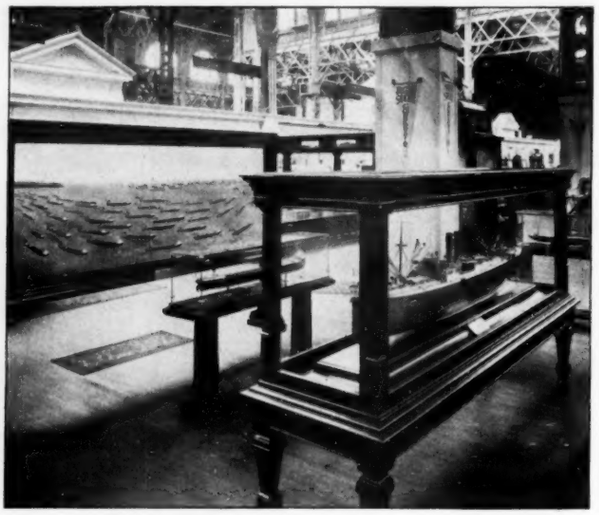


Fig. 3—This Illustration Shows Models of One of the Steel Corporation's Ocean-Going Vessels and of a Vessel Especially Designed for the Great Lakes Ore Trade. The Painting in the Background Shows the Great Ore Fleet of the Pittsburgh Steamship Co.

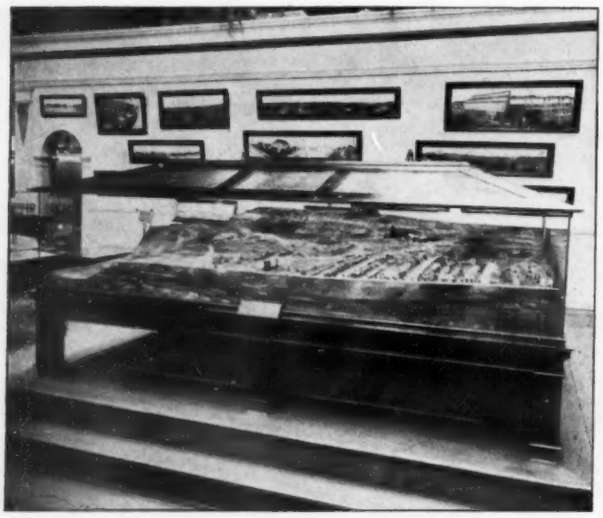


Fig. 4—Model of the Sauntry-Alpena Open-Pit Mine. This Model Shows the Method of Conducting Open-Pit Operations and Reproduces the Mine Buildings, Shops, Offices, Club and Houses for the Employes in Minute Detail

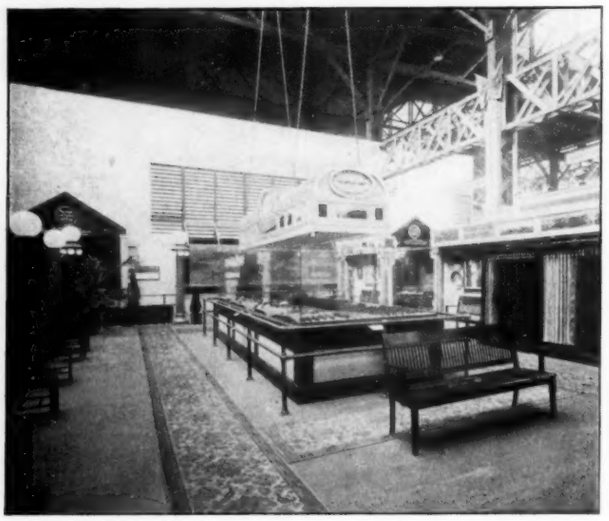


Fig. 5—American Sheet & Tin Plate Co.'s Exhibit, Showing Samples of Sheets, as Well as a Model of a Farm. The Latter Illustrates the Use of Galvanized Sheet Steel in Farm Buildings and Equipment

This Exhibit Fills the Entire Southern End of the Mines and Metallurgy Building, Occupying Nearly an Acre of Floor Space

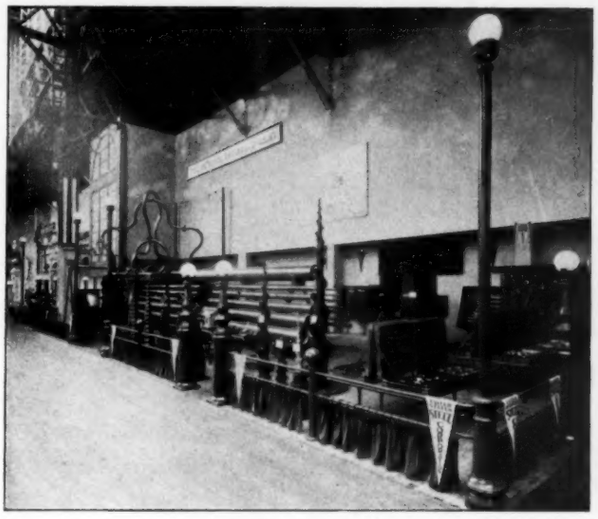


Fig 6—A portion of the National Tube Co.'s exhibit showing the great variety of uses for tubular goods. The exhibit includes plain pipe of various sizes, ornamental lamp posts, pipe fittings, seamless tubing, unions, and valves of all kinds

Fig. 7—View of Pyramid of Shapes and Steel Sheet Piling. This illustration gives a clear idea of the tremendous amount of work involved in preparing the exhibit for the public. Neither money nor effort was spared and no details were forgotten

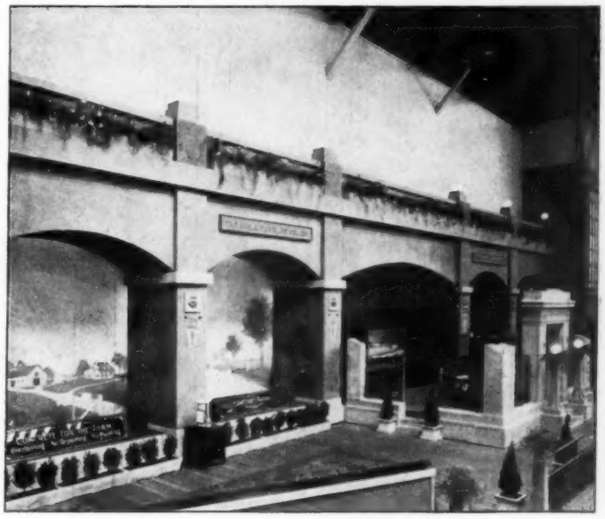


Fig. 8—Universal Portland Cement Co.'s Exhibit Showing Illuminated Oil Paintings Which Illustrate the Various Uses of Concrete. This Exhibit Includes a Working Model of Plant No. 5 at Universal, Pennsylvania

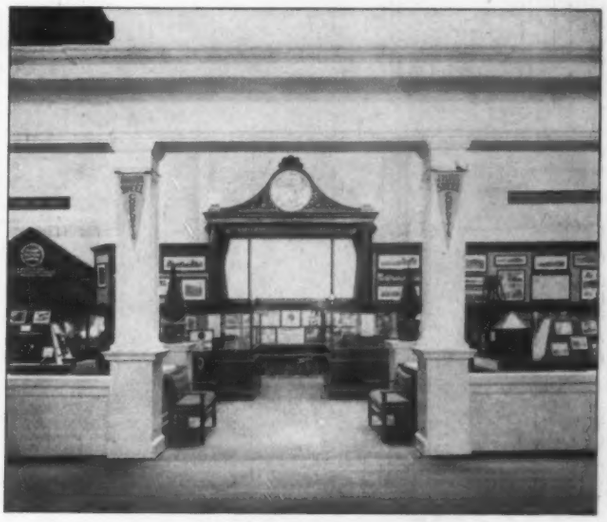


Fig. 9—Entrance to Exhibit of Bureau of Safety, Sanitation and Welfare of Steel Corporation. This View Shows Numerous Models Which Illustrate the Steel Corporation's Safety, Sanitation and Welfare Work

Fig. 10—This View Illustrates, in a Remarkable Manner, the Purpose of the Steel Corporation to Make its Exhibit Educational. From Left to Right, We See the Ingredients of a Blast Furnace Charge; a Modern Blast Furnace in Miniature and Models of a Bessemer Converter, Open Hearth Furnace, an Electric Furnace, and a Working Model of a Blooming Mill, Which in Turn is Equipped with Model of a Reversing Rolling Mill Motor. This Section of the Exhibit Shows Samples of all Grades of Pig Iron, Ferro-Silicon, and Ferro-Manganese, a Steel Ingot and Cross-Sections and Samples of Various Finished Steel Products

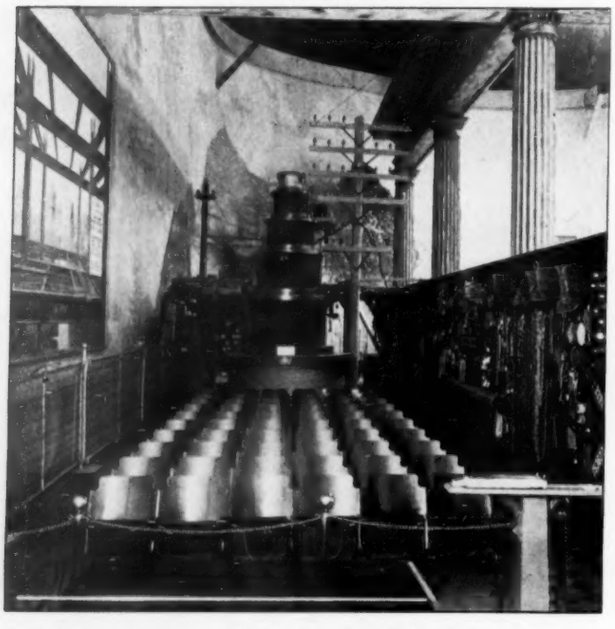


Fig. 11—A View of the American Steel & Wire Co.'s Exhibit, Showing Products Made From Wire and Also the Seating Capacity Which Has Been Arranged For Visitors Who Attend the Pipe Organ Concerts

Fig. 12—Another View of American Steel & Wire Co.'s Exhibit. In the Background is Shown a Portion of an Oil Painting More Than 400 Feet Long, Which Illustrates Many Uses of Wire and Wire Products

Rapid Decline

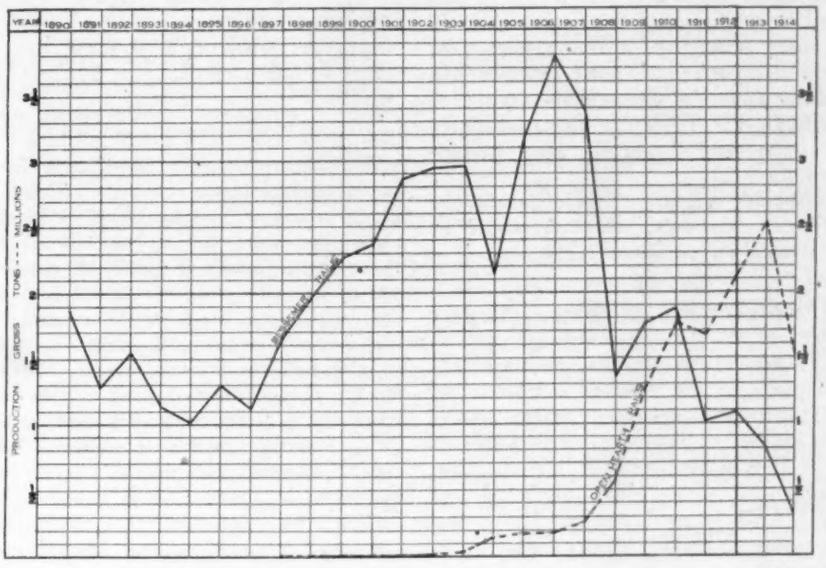
In Production of Bessemer Rails—Small Output Last Year

The production of rails in the United States in 1914, as shown by a bulletin issued by the bureau of statistics of the American Iron and Steel Institute, amounted to 1,945,095 tons, compared with 3,502,780 tons in 1913. The rapid decline in the production of bessemer rails is shown by the fact that the decrease was 60.38 per cent in 1914, as compared with 1913, while the decrease in open-hearth was 39.64 per cent, and in all other rails 39.45 per cent. In the table showing the production of alloy-treated steel rails, it is noteworthy that the tonnage has declined very rapidly, having been 257,324 in 1910 and only 27,937 in 1914.

Years.	Total production. Gross tons.	Production by alloys.		Production by processes.		Production by weight.		
		Titanium.	Other alloys.	Open-hearth and electric.	Bessemer.	Under 45 lbs.	45 and under 85 lbs.	85 lbs. and over.
1909..	49,395	35,945	13,450	13,696	35,699	...	9,132	40,263
1910..	257,324	256,759	565	27,389	229,935	...	70,170	187,154
1911..	153,989	152,990	999	38,539	115,450	...	27,097	126,892
1912..	149,267	141,773	7,494	40,393	108,874	21	5,426	143,820
1913..	59,519	47,655	11,864	33,567	25,952	*91	†9,414	50,014
1914..	27,937	23,321	4,616	27,447	490	*14	†1,168	26,755

* Includes rails under 50 pounds. † Includes 50 pounds and less than 85 pounds.

PRODUCTION OF ALLOY-TREATED STEEL RAILS, 1909-1914



PRODUCTION OF BESSEMER AND OPEN HEARTH RAILS, 1890-1914

Years.	Open-hearth.	Bessemer.	Rerolled.*	Electric.	Iron.	Total.
1897	500	1,644,520	Included with Bessemer and open-hearth steel rails from 1897 to 1910 inclusive.	.....	2,872	1,647,892
1898	1,220	1,976,702		.....	3,319	1,981,241
1899	523	2,270,585		.....	1,592	2,272,700
1900	1,333	2,383,654		.....	695	2,385,682
1901	2,093	2,870,816		.....	1,730	2,874,639
1902	6,029	2,935,392		.....	6,512	2,947,933
1903	45,054	2,946,756		.....	667	2,992,477
1904	145,883	2,137,957		.....	871	2,284,711
1905	183,264	3,192,347		.....	318	3,375,929
1906	186,413	3,791,459		.....	15	3,977,887
1907	252,704	3,380,025		.....	925	3,633,654
1908	571,791	1,349,153		.....	71	1,921,015
1909	1,256,674	1,767,171		†	.....	3,023,845
1910	1,751,359	1,884,442		†	230	3,636,031
1911	1,676,923	1,053,420	91,751	462	234	2,822,790
1912	2,105,144	1,099,926	119,390	3,455	.....	3,327,915
1913	2,527,710	817,591	155,043	2,436	.....	3,502,780
1914	1,525,851	323,897	95,169	178	.....	1,945,095

* Rerolled from old steel rails and renewed rails which the manufacturers could not classify as Bessemer or open-hearth. † Small tonnages rolled in 1909 and 1910 but included with Bessemer and open-hearth rails for these years.

PRODUCTION OF RAILS BY PROCESSES, GROSS TONS, 1897-1914

Birthday Tribute to Railroads

Long experience as a salesman has not embittered E. S. Jackman, of E. S. Jackman & Co., Chicago, agents for the Firth-Sterling Steel Co. He believes that the man who has been selling steel to the railroads since his 20th birthday has the moral right to crown his 50th birthday with the following tribute to American railroads:

"A railroad is not the unfeeling and relentless devourer of automobiles and little children at grade crossings described by impassioned advocates in crowded court rooms. The whistle of danger is an engineer's use of a piece of machinery, but it also echoes a man's thought for his own babies.

"A railroad has been likened to an octopus by those who do not know the flesh and blood and personality of railroads. The soul of a railroad is fidelity, and if a railroad is an octopus, it is an octopus with a soul.

"A railroad is a disciplined power; owning rails and cars and locomotives; engaging the highest quality of mechanical skill and expert knowledge; but the glory of a railroad is the united adjustment of its living nerves to patience, courtesy, speed and safety."

Sabers for Russia.—E. B. Roberts, vice president of the Henry Disston Sons & Co., Philadelphia, has denied a report that his company had received large contracts for swords for European governments. He stated, however, that the Disston company has submitted, through J. P. Morgan & Co., New York City, a bid on 10,000 sabers and scabbards for Russia.

Business News of Nation's Capital

Steel for Battleship California Awarded—Slag Case May Be Dismissed by the Interstate Commerce Commission

Washington, March 30.—Awards for plates and other steel material for the battleship California, building at the New York navy yard, were completed last week. The lowest bidder in each instance received the contract. The bulk of structural steel plates went to the Worth Bros. Co., Coatesville, Pa., and the Carbon Steel Co., Pittsburgh, at prices ranging from 1.357 cents per pound for medium steel to 4.747 cents per pound for nickel steel, the value of the material purchased being about $377,134. The Carnegie Steel Co. was awarded the angles, bulbs, etc., at prices varying from 1.36 to 2.3 cents per pound, the aggregate being about $84,300. Castings went to the Baldt Steel Co., at $36,274, most of them being bought at $87.808, which Secretary Daniels said compared with $92 per ton paid for similar castings in 1913 for the Arizona. The rivets, about 850 tons, went to the Pittsburgh Screw & Bolt Co., at about $42,500, the price being the lowest paid for rivets in several years, according to Mr. Daniels. The bulk of the special treatment steel went to the Carbon Steel Co. at 7.15 cents per pound, the total being $417,989. The remainder of the special treatment steel of greater thickness was awarded to the Carnegie company at unit prices ranging from 7.85 to 10.50 cents per pound, the total being $37,184. The total cost of structural material, excepting nickel and special treatment steel, was $371,601.

Mr. Daniels said the navy department saved about $1,013,766 on the Arizona and California, and about $42,000 on the latter for structural material as compared with the price paid for that kind of steel for the Arizona. He said there was a reduction of $635,505 in the cost of special treatment steel for the California, as compared with the New York.

Getting Data About Machinery

Washington, March 30.—E. E. Pratt, chief of the bureau of foreign and domestic commerce, department of commerce, recently sent out letters to obtain additional data regarding the cost of production of cotton textile machinery, in pursuance of the act of congress of Aug. 23, 1912.

Department inspectors engaged in this work have visited machine shops making textile machinery and gone over their books and plants. It has been reported that these plants were discovered to have been conducted with unusual efficiency. The claim has been made in some quarters that the discovery would well justify a higher tariff on this class of machinery than that provided in the Underwood-Simmons law. Past experiences, however, with regard to investigations by the department of commerce have caused makers to abandon hope that the department as now managed will make any such recommendation, even though the report is first submitted to the department by the investigators.

Should a tariff board again be created, however, the data would be extremely convenient for it.

One Result of Free Sugar

Washington, March 30.—Machinery imports in the Philippine islands for 1914 from the United States totaled $2,538,445, as compared with $3,371,222 for 1913, while from the United Kingdom the totals were $1,655,034 and $1,974,928, respectively, and from other countries $484,556 and $791,352, respectively.

The machinery, most of which was for the manufacture of sugar, showed a decline in value because of the Underwood-Simmons tariff, as is indicated by the statement given out by the bureau of insular affairs of the war department. It is pointed out by the bureau that imports of iron and steel during the first seven months exceeded by more than $1,000,000 those of the corresponding period of 1913, but this was reversed later, and that was a reduction of $1,630,460 for the year. Though the trade suffered generally from war conditions, sugar machinery, which reached more than $1,000,000 in 1913, was the leading item in this decline and accounts for more than half. During the latter part of 1913, says the bureau of insular affairs, these imports were unusually heavy in connection with the installation of new mills, but the prospect of free sugar in the United States and the reduced sugar production of that year were not conducive to new contracts and further development of the industry. The result was that imports in 1914 amounted to only $170,030, the smallest sum since 1910, when the modernization of the Philippine sugar mill began. The total net result for 1914 was a decrease of $4,724,133 in imports and an increase of only $916,678 in exports.

In the distribution of Philippine trade by countries in 1914 the United States was credited with half the total value of both imports and exports, the considerable increase in the proportion of exports being chiefly due to the resumption of sugar shipments to the American market.

Chance for Russian Trade

Washington, March 30.—Henry D. Baker, commercial attache at Petrograd, who will leave the United States to return to his post in about 10 days, has taken up with the chamber of commerce of the United States the possibility of interesting American firms in trade with Russia. Due to changed conditions brought about by the war, Russia desires to obtain from the United States various articles, knitting machinery being included in the list which has been submitted.

May Dismiss It

Washington, March 30.—Asserting that railroad testimony has shown that 95 per cent of the traffic covered by slag tariffs filed with the interstate commerce commission is of an intrastate character, steel interests protesting against the charges think the federal commission will rule it has no jurisdiction. Attorney Richard Jones Jr., representing the independent steel companies of the Mahoning and Shenango valleys of Ohio and Pennsylvania, respectively, made a motion last Friday afternoon, when the slag hearing, held before Examiner George T. Bell, came to an end, that the commission dismiss the case for lack of jurisdiction and enter an order cancelling the tariffs. The examiner said the motion would be noted.

Attorneys on both sides were notified that briefs should be filed with commission by April 25 so that oral arguments could be held as soon thereafter as possible. It is the hope of the commission, Mr. Bell said, to render a decision before the summer recess.

Elaborate data were furnished by

steel witnesses to prove that the railroads are extensively using the slag on which they propose transportation charges from western Pennsylvania, eastern Ohio and West Virginia. Protest was also made that railroads participating in the slag tariffs have not proposed charges for hauling the material from competitive furnaces, among them being those of Chicago, southern Ohio and Buffalo.

From Panama to Alaska

Washington, March 30.—Confirmation has been given by the Washington office of the Alaskan railway commission of cable dispatches from Panama to the effect that H. P. Warren, an engineer representing the commission, has reached the canal zone for the purpose of selecting canal machinery which may be used in the construction of the proposed government railroad in Alaska. The machinery desired is some of that used to build the canal, and Mr. Warren, who was the engineer in charge of the construction of the fortifications of the canal zone, was selected to inspect the machinery so that he might choose whatever may be available for use in Alaska.

Reports, however, that Mr. Warren is to purchase for the Alaskan commission machinery that may run into the millions of dollars, and that he is expected to employ workers who have aided in the construction of the canal, so that their services may be utilized in building the government railroad in Alaska are denied at the Alaskan commission office.

President Wilson is not expected to delay long in announcing to the commission his approval of a route, and as $2,000,000 of the $3,000,000 authorized for the railroad has been made immediately available, the commission expects to get to work constructing the railroad in the near future.

Gary Operating at 80 Per Cent

Chicago, March 29.—Operations at the Gary plant of the Illinois Steel Co. are now on a basis of 80 per cent of ingot capacity. Six of the eight blast furnaces are operating and 28 of 42 open hearths are active.

Owing to a broken fly wheel at the South Chicago plant of this company, some tonnage has been transferred to Gary until repairs can be made.

The Inland Steel Co. is operating somewhat in excess of 60 per cent, some restriction being felt on account of the situation in sheets, which is not to any extent productive of large tonnages.

On Steel Pier

At Atlantic City, A. F. A. Will Hold Meetings of Convention

At the annual meeting of the American Foundrymen's Association at Atlantic City during the week of Sept. 27, business and technical sessions will be conducted on Young's steel pier, almost directly opposite the Marlborough-Blenheim, which will be the headquarters. The exhibit of foundry equipment and supplies under the auspices of the Foundry & Machine Exhibition Co., will be held on the steel pier and will open Saturday, Sept. 25. A tentative program of the meeting already has been adopted, as follows:

Monday, Sept. 27.

Registration.
(Headquarters Young's steel pier.)

Tuesday, Sept. 28.

10:00 a. m. Opening session, joint meeting of the American Foundrymen's Association and the American Institute of Metals.
2:00 p. m. Operating session.

Wednesday, Sept. 29.

10:00 a. m. Business session.
2:00 p. m. Gray iron session.
8:00 p. m. Business session, annual address by president, election of officers, etc.

Thursday, Sept. 30.

10:00 a. m. Simultaneous sessions on steel and malleable iron.
2:00 p. m. Simultaneous sessions on steel and malleable iron.
7:00 p. m. Annual banquet.

Friday, Oct. 1.

10:00 a. m. Final business session.

It will be noted that this tentative program provides for two sessions for the discussion of cast steel and two meetings will be devoted to malleable iron. At the last meeting, held at Chicago, insufficient time was allotted for the discussion of the many valuable papers presented and to enable those who are interested in these topics to discuss the papers at length, two session will be devoted to steel and malleable, respectively. The change in the session at which officers are elected was effected for the purpose of giving the new officers an opportunity to meet prior to the close of the convention for the purpose of outlining the ensuing year's work.

The papers committee already is actively at work on the program, obtaining contributions and any member desiring special topics discussed should send his suggestions either to the secretary or to Harry B. Swan, chairman of the papers committee, Cadillac Motor Car Co., Detroit. The committees appointed at the last annual meeting also are at work and many interesting and valuable reports will be presented at the Atlantic City meeting.

The proposed revision of the constitution and by-laws, passed to letter ballot at the Chicago meeting has been favorably acted upon, 103 ballots having been cast in favor of the revision and 3 against. The revised constitution and by-laws appear in the year book and the principal changes provide for an entrance fee after May 1, 1915, of $10 for active members and $5 for associate members.

The Associated Foundry Foremen have given up their charter and all of the members in good standing are now affiliated with the American Foundrymen's Association as associate members. The total number added to the enrollment is 102, thereby increasing the total membership of the American Foundrymen's Association to nearly 1,000, the highest mark attained since its organization.

In view of the fact that no emblem of the society was ever officially adopted, President R. A. Bull appointed an emblem committee immediately following the convention, which consisted of A. O. Backert, Cleveland, chairman; Thomas D. West, Benjamin D. Fuller, H. Cole Estep and R. A. Bull, president (ex officio). Numerous designs were prepared and submitted for consideration, resulting in the adoption of an appropriate emblem. Also, it was decided to reproduce this emblem in the form of a button and these now are available to the members in gold and black enamel at $2 each. The buttons are exceedingly handsome. They can be obtained by addressing the secretary, A. O. Backert, Twelfth and Chestnut streets, Cleveland, O.

Disston Exhibit

Henry Disston & Sons, Philadelphia, saw and saw tool manufacturers, are demonstrating an unusually complete line of their products at the Panama-Pacific exposition at San Francisco. The exhibit is housed in the Palace of Manufactures.

In the exhibit, four large keystones, each 12 feet 6 inches high, 10 feet 6 inches wide and 2 feet thick, are mounted on a revolving turret, 20 feet in diameter, which stands 2 feet above the floor. On the faces and edges of the keystones and in a pyramid on the turret are displayed the products of the Disston company, including all sizes of saws, saw tools, files, squares, bevels, machine knives, barker, chipper, molding, leather splitting, paper trimming, cane and cloth knives. The display includes hack, band, armor plate cutting, pattern metal cutting, and wood cutting saws.

The exhibit also commemorates the seventy-fifth anniversary of the organization of the company.

The offices of Trimble, Mudge & Co., Pittsburgh, iron and steel merchants, have been moved from 1332 to 1334 Oliver building.

Money and Iron: Fact and Comment

Large Earnings of the Bethlehem Steel Corporation

Attributed by President Schwab to the Policy of Extensive Development in Diversified Lines—Stock of the Company Advances Rapidly During a Week of Many Gains

In striking contrast with the report of nearly all steel companies of the past year, the tenth annual report of the Bethlehem Steel Corporation for the year ended Dec. 31, 1914, is a wonderful story of prosperity. In his very brief remarks, President Schwab makes no reference to extraordinary conditions at home or abroad, but merely says that notwithstanding the generally depressed state of trade throughout the year in commercial lines, the corporation has been enabled, owing to the variety of its products,—a direct result of its policy of extensive development in diversified lines of manufacture,—to report the best record in its history, its total net earnings being $9,649,667.71, as against $8,752,671.44 for the year 1913. Mr. Schwab adds: "In view of these earnings, a dividend was declared on the preferred stock of your corporation of the full 7 per cent, payable in quarterly installments during 1915.

"On June 11, 1914, Bethlehem Steel Co. issued $3,000,000 of its one-year 5 per cent secured gold notes, guaranteed principal and interest by your corporation, and secured by a pledge of $4,300,000 first lien and refunding mortgage 5 per cent 30-year gold bonds, of which notes $1,410,000 face value have, since the close of 1914, been cancelled or called for redemption."

The company's average number of employes in the United States and its payrolls in the past four years compare as follows:

	Number.	Payrolls.
1911	11,802	$9,218,049.80
1912	11,965	10,034,265.07
1913	15,052	13,366,399.92
1914	15,586	14,312,948.78

The report shows a surplus for dividends after all deductions of $5,590,020, equivalent to 7 per cent on the $14,908,000 preferred stock and in addition 30.59 per cent on the $14,862,000 common stock. This compares with $5,122,703, or 7 per cent, and 27.44 per cent, respectively, on the same stock the previous year. One of the most significant features of the statement was the report of orders on hand, showing a value of $46,513,189.95 as of Dec. 31, 1914, as compared with $24,865,560.10 the corresponding date the previous year. This indicates that the Bethlehem's report for 1915 will reflect more fully the profits derived from the "war orders" started in 1914. The income account for the past year compares as follows:

	1914.	1913.
Net mfg. profit	†$9,378,385	$8,530,708
Other inc.	271,282	221,963
Total inc.	$9,649,668	$8,752,671
Int. on notes and adv.	170,999	137,164
Int. fd. debt	2,041,375	1,964,020
Depreciation	1,500,000	1,272,270
‡Extinguish	347,273	256,516
Tot. deduct	4,059,647	3,629,970
Surplus	$5,590,020	$5,122,703
Pfd. div.	745,400	745,400
Balance	$4,844,620	$4,377,303
Disc. on sec.	.....	3,180,740
App. for add., wk. cap.	5,000,000	.....
Prev. surp.	2,214,517	1,017,954
P. & L. surp.	$2,059,137	$2,214,517

†After deducting expenditures for ordinary and extraordinary repairs and maintenance, approximately $2,869,000.

‡Provision for extinguishment of mining investments, amortization of patents, etc.

Balance Sheet

The balance sheet of the Bethlehem Steel Co. as of Dec. 31, 1914, compares as follows:

ASSETS.

	1914.	1913.
Property account	$80,480,919	$72,891,695
Funds with trustee	34,478	34,461
Invents	11,130,734	10,206,734
Notes and accts. rec.	8,448,851	9,909,956
Cont. & deprec. fund.	403,839	.....
Misc. inv.	437,664	365,372
Cash	5,220,910	1,963,281
Defer chgs.	220,369	227,800
Total	$106,377,767	$95,599,300

LIABILITIES.

Pfd. stock.	$14,908,000	$14,908,000
Com. stock	14,862,000	14,862,000
Fund. debt	36,207,700	33,599,033
Notes and accts. pay.	12,664,619	9,642,813
Bond int.	487,814	483,807
Res. for deprec., etc.	10,721,074	9,586,010
Res. for relin. fur., etc.	1,967,421	2,803,119
Appro. surp.	12,500,000	7,500,000
Surplus	2,059,137	2,214,517
Total	$106,377,767	$95,599,300

Net earnings from operations, after deducting expenditures for ordinary and extraordinary repairs and maintenance, since the company's organization, compare as follows:

	Net earnings.
Year ended Dec. 31, 1905	$3,622,475.50
Year ended Dec. 31, 1906	2,011,368.34
Year ended Dec. 31, 1907	2,642,178.07
Year ended Dec. 31, 1908	2,196,172.04
Year ended Dec. 31, 1909	2,993,536.31
Year ended Dec. 31, 1910	4,524,141.30
Year ended Dec. 31, 1911	4,792,713.53
Year ended Dec. 31, 1912	5,114,439.93
Year ended Dec. 31, 1913	8,752,671.44
Year ended Dec. 31, 1914	9,649,667.71

Orders on hand as of Dec. 31 compare as follows:

December:—	
1905	$14,466,307
1906	13,300,885
1907	8,425,736
1908	7,592,502
1909	14,073,834
1910	17,370,660
1911	15,885,198
1912	29,282,182
1913	24,865,560
1914	46,513,189

Westinghouse Electric Conditions

Concerning Westinghouse Electric & Manufacturing John Muir & Co.'s *Odd Lot Review* says:

"While Westinghouse business was hurt in some lines, notably in cancellation of contracts for new machinery used in big manufacturing lines, the diversified nature of the company's activity has made it possible to keep the plants fairly busy. During the past year there has been no let-up in the demand for many of the smaller electrical appliances. In the past few months larger orders have begun to come in. The British Westinghouse Co., in which the American concern is a large shareholder, has completed the most successful year in its history. Some months ago the British company took over the British and Italian Westinghouse concerns, so that the American company's foreign interests are now concentrated in the English organization. The British government is now considering taking over the British Westinghouse company on a basis which will guarantee shareholders the dividends which have been earned during the past year. This would be decidedly favorable to the Westing-

house Electric & Mfg. Co. During the past year the Russian Westinghouse subsidiary was liquidated on favorable terms which were concluded just before the war. There is a large amount of money due from the closing out of the Russian business, but so far no attempt has been made to have the funds credited because of the high rate of foreign exchange. We understand, however, that this balance is considered entirely safe."

Industrial Stocks

Last week's advances on the New York stock exchange carried many prices to new high records for the year. Bethlehem Steel held the center of the stage, making an advance of 8⅜ points for the week. Since July 30, this stock has advanced from 30 to 73. Various causes are ascribed for the advances last week, such as the fall of a great Austrian fortress, the tremendous figures of export trade, the flow of gold to New York and the increasing change in sentiment on the part of the public favorable to great corporations. Changes in stocks closely identified with the iron and steel business were as follows:

American Brake Shoe & Fdy. Co.	+4
Amer. Brake Shoe & Fdy. Co., prfd.	+ ⅜
American Can	+ ¼
American Can, prfd.	— ⅛
American Car & Fdy. Co.	+5⅜
Amer. Car & Fdy. Co., prfd.	+ ⅜
American Locomotive	+5⅜
American Steel Foundries	+1¼
Baldwin Locomotive	.....
Baldwin Locomotive, prfd.	+2
Bethlehem Steel	+8⅜
Bethlehem Steel, prfd.	— ½
Colorado Fuel & Iron	+3⅜
Continental Can	+2
Continental Can, prfd.	+1¾
General Electric	+2½
International Harv. of N. J.	+3¼
Inter. Harv. of N. J., prfd.	+ ¾
Inter. Harv. Corp.	+5
Inter. Harv. Corp., prfd.	+7½
Nat'l Enameling & Stamping Co.	.....
Pressed Steel Car	+4⅛
Pressed Steel Car, prfd.	+5½
Pullman Palace Car	+1½
Republic Iron & Steel Co.	+1¼
Republic Iron & Steel Co., prfd.	+ ½
U. S. Cast Iron Pipe & Fdy.	.....
U. S. Cast Iron Pipe & Fdy., prfd.	.....
United States Steel	+3½
United States Steel, prfd.	+1⅛
Westinghouse Mfg.	+3⅜

Good Showing

Despite the demoralized business of last year, the low prices of metals and the fact that its large business in Mexico was not at all profitable, the American Smelting & Refining Co.'s net earnings for the year ended were $10,571,915, or only about $700,000 less than the preceding year. The company's report for last year is the first to give details with reference to the volume of business. The figures show that something in excess of $200,000,000 worth of material was manufactured. Net earnings in 1914 of $10,667,822 were equivalent to 6.03 per cent on the $50,000,000 common stock after charging off $1,540,350 for depreciation, compared with $10,926,254 or 7.47 on the same stock the previous year, when $1,525,518 was charged off.

Emerson-Brantingham Report

The Emerson-Brantingham Co., agricultural implement manufacturer, Rockford, Ill., assigns the disappointing showing in its annual report for the fiscal year ended Oct. 31, 1914, to decreased volume of sales, increased cost due to slow factory operations, largely increased cost of collections after Aug. 1 and increased interest paid because of higher rates the greater part of the year.

The company reported a net loss for the year of $288,965 before dividends. Disbursements to stockholders of $638,951 on the preferred stock brought the total deficit for the year to $927,916, as against a surplus for the preceding 15 months of $327,276. As the company carried over a surplus of $453,175 from its previous year the deficit as of Oct. 31, 1914, was $474,742. No provision was made during the year for depreciation and accruing renewals.

J. I. Case Threshing Machine Report

The J. I. Case Threshing Machine Co., Racine, Wis., reports for the year ended Dec. 31, 1914, largest gross sales in its history. The total was $14,395,384, of which $12,178,286 were domestic and $2,217,097 foreign. Sales for the first half of the year were $5,459,431 and the second half $8,935,952. The surplus net profits for the year were $966,697.

On Dec. 1, 1914, the company redeemed and canceled $1,500,000 under the trust deed dated Feb. 1, 1914, leaving $10,500,000 outstanding as of Dec. 31, 1914. The high point of indebtedness on bonds and notes in the course of the year was reached July 5 with a total liability in bonds and notes of $16,785,000, liquidation of current assets being effected to the extent of $4,535,000 between that date and Dec. 24, when the liability was reduced to its lowest point for the year, $12,250,000.

The Union Switch & Signal Co. has declared the regular quarterly dividend of 1½ per cent on both the common and preferred stocks, payable April 15 to stock of record March 31.

Financial Notes

The Wellman-Seaver-Morgan Co., Cleveland, has declared the quarterly dividend on preferred stock, payable April 15. Books close April 5.

The Westinghouse Electric & Mfg. Co., Pittsburgh, has declared the regular quarterly dividend of 1¾ per cent on the preferred payable April 15 to stock of record March 31, and of 1 per cent on common, payable April 21 to stock of record April 5.

Steel Heating Research Club

The Steel Treating Research Club of Detroit, which was organized in Detroit about one year ago, is just starting on the second year of its organization. At the March meeting of the club, C. N. Dawe, metallurgist of the Studebaker Corporation, Detroit, was elected president and C. R. Poole, chemist and metallurgist of the Frost Gear and Forge Co., Jackson, was elected secretary. The club is composed of hardening room foremen, chemists and metallurgists of the plants in and around Detroit, that are heat-treating steel. The associate membership is open to representatives of concerns whose products are connected with heat-treating departments. The club has issued loose-leaf binders to members in which to file the copies of the proceedings. The program committee has arranged some very interesting meetings for the next few months. On April 3d, Dr. G. W. Sargent, third vice president and metallurgist of the Crucible Steel Co. of America, will give an illustrated talk, taking up the manufacture of steel and some of its physical characteristics together with a description of the new plant of his company at Midland, Pa.

So heavy a demand has been made for space at the cement show in Chicago in 1916 that the Cement Products Exhibition Co. has found it necessary to rent the First Regiment Armory in addition to the Coliseum and annex. In order to obtain the additional space, it was necessary to change the dates for the ninth annual show and this will be opened at 2 p. m., Saturday, Feb. 12, 1916, and continue until Saturday night, Feb. 19.

The Central Railway Signal Co., Columbia bank building, Pittsburgh, is now located in the First National Bank building, that city.

The McFeely Brick Co., Diamond Bank building, Pittsburgh, will occupy offices in the First National Bank building, that city, after April 1.

News of Employers and Employes

Cleveland General Contractors Make Closed Shop Contracts With Unions —Labor Leader Convicted and Fined

After a long controversy, general contractors of Cleveland doing reinforcing concrete work have surrendered to the unions. An agreement has been made with the Structural Iron Workers' Union whereby the members of the union are to bend, place and tie all reinforcing material entering into reinforced concrete work at 70 cents per hour. This work was formerly done by laborers at from 30 to 35 cents per hour. Hence the contract not only doubles the labor cost of this class of work and takes the work away from workmen to whom it properly belongs, but closes the industry to every workman except members of the Structural Iron Workers' Union. It is estimated that this means an increase of at least 10 per cent in the cost of construction of this class of buildings. The union will graciously allow laborers to carry the reinforcing bars to the men who place them.

Contracts have also been made with the carpenters' union by which its members will work eight hours at 55 cents per hour, as compared with the old wage of 35 cents.

General contractors say they were forced into the adoption of the closed shop on account of the strong competition from contractors outside of the city employing union labor, and because owners of store buildings and others catering to union trade insisted upon union men being employed. They also say that a remarkable fact connected with the long struggle is that some manufacturers who have long fought for the open shop principle in their own plants refused to stand by the contractors in a fight against the closed shop, even when engaged in erecting buildings for the manufacturers.

Union President Convicted

Frank Smith, president of the Cleveland Building Trades Council, has been fined $25 and costs by Judge Kramer in municipal court of that city, upon entering a plea of guilty to a charge of assault. Smith assaulted a non-union workman by the name of Charles Stipley, whom he found doing painters' work in the Colonial arcade. Smith shook the ladder upon which Stipley was standing, causing him to fall and sustain serious injuries which kept him in bed several days. A lady, an eye witness, stated that Stipley might have been killed by the fall.

A subscriber to *The Iron Trade Review* writes, calling attention to the conviction of Smith and adds that he is one of the men to whom the general contractors "have handed over the control of the building industry of Cleveland".

English Labor Situation

(Staff Correspondence.)

Birmingham, Eng., March 19.—While everybody is pleased with the military and naval progress, interest for the moment centers upon the manufacturing and trade departments of the war. Lord Kitchener has issued a strong appeal for a larger output and has indicated the intention of the government to stimulate production, if necessary, by taking over the factories and taking in hand their organization. To a surprising extent, while there have been discordant notes here and there, arising purely from natural distrust of Socialistic tendencies, there has been wonderful co-operation on the part of both capital and labor. Probably, one of the most extraordinary conferences ever held was that on Wednesday last between Lloyd George, the chancellor, Mr. Runciman, the president of the board of trade, and the representatives of nearly 30 of the largest trade unions. In addition, the army supply departments were well represented. Mr. George appealed for labor support in the settlement of disputes, in the suspension of trade union restrictions of output, a much larger employment of female labor, and co-operation in dealing with drinkers and slackers. There seems no doubt that, both from the point of view of capital and labor, the strongest co-operation will be given to the government in the supply of the necessary material for the speedy finishing off of the war. A remarkable result is a great movement initiated here in Birmingham for the much more extensive employment of women labor. Thousands of women have expressed their willingness either to undertake machine work in the factories, clerical work in the offices, or to take the place of shop assistants; and a very important part of the scheme is an arrangement by which it is hoped to bring many workers, otherwise employed during the day, into the factories for a certain amount of night employment, with the object of giving a much-needed rest to workmen who have practically had no recreation Sunday or weekday for many months past. In the meantime, wages continue to rise. A typical example is the demand for 20 per cent by miners everywhere which is certain to be conceded. Similarly, the ship yard laborers are receiving ¾d an hour advance, platers' helpers 10 per cent, with similar advances to other unskilled or semi-skilled workers. The rise in the price of fuel is, of course, a very serious matter, yet one of our largest coal owners has stated that the output of coal today is 20 per cent less than before the war, and, in spite of higher prices, employers' profits have gone down seriously, and no coal owner is satisfied.

An appeal has been made, on behalf of the coal owners, to the government to take the matter in hand, with a view to the cessation of supplies of coal to neutral countries, so as to alleviate, to some extent, this serious disorganization.

One of the natural results of the war has been a great increase in activity and profits to armament companies and their shareholders. A summary of the leading companies such as Vickers, Armstrongs, Eley Brothers, Cammell Laird & Co., Birmingham Small Arms, all show very substantial advances in the market value of shares. Apart from war material, there is practically no lack of commodities, and while food prices are high, there is no real scarcity.

Plan Safety Laws

Safety Commissioner Victor Noonan, of the Ohio state industrial commission, recently met representatives of 25 Cleveland foundries to discuss plans for having new legislation enacted to promote safety. Thomas D. West, of the West Steel Casting Co., Cleveland, was named chairman of a committee which is to work with four sub-committees composed of foundry proprietors and foundry employes and devise safety measures.

Reports that the Petroleum Iron Works Co., Petroleum, O., had purchased additional land for extension purposes are officially denied.

Steel Famine is Rapidly Developing

In Great Britain—All Steel Works Overwhelmed With Orders—Results of Excessive Drinking Among Workers Are Apparent

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., March 19.

There was a general rise in values of all descriptions at yesterday's Birmingham meeting. While there was a large attendance, many makers and dealers were not prepared to sell, and in some cases they deliberately imposed prohibitive prices. Yet this by no means had the desired effect, and a number of contracts at decidedly fancy figures have been arranged, with a good deal of latitude to the makers as to time of delivery. A steel famine is rapidly developing. All the steel works are overwhelmed with orders, and many will not consider any requests for delivery within the next six months. Most order books are filled until next autumn. The position is becoming really serious in regard to billets. Ordinary bessemer qualities are now being sold at £7 ($33.60) and upwards, £7 10s ($36) not being an uncommon price. A significant example is the case of high carbon billets for which £8 ($38.40) was paid on a standard quotation of £7 10s ($36). The actual selling price has now become £8 10s ($40.80), the standard being £8 ($38.40). The 10s ($2.40) has been offered by the buyer to encourage early delivery or, in some cases, as the only means of securing acceptance of the order. The ordinary steel buyer is getting very little look-in, against the more pressing demands of the government. One of the effects of the steel demand has been to lead consumers to revert to iron for navy purposes for which in recent years steel has been employed.

The makers of marked or best iron bars have booked a large amount of new business at the recent advance, and a further rise is very commonly talked of.

As indicating the state of the labor market, the iron founders last week increased their selling price £1 ($4.80) per ton. The next morning deputations of their workpeople came in demanding a substantial increase in wages on the strength of this rise, which their employers were obliged to concede.

A little improvement is reported in the tin plate trade. The rail mills are fairly well employed and in South Wales a war bonus of 2s (48c) to 3s (72c) per week has this week been granted to employes in the tin plate and iron and steel industries.

In the galvanized sheet trade sheets are selling up to £15 ($72) per ton, not because of any great demand but through costly production arising especially from the price of spelter.

Pig Iron Values Jump

The week has witnessed one of the most decided increases in pig iron values since the beginning of the war. There has been a rise on the week of Cleveland warrants of 4s 6d ($1.08), yesterday's quotations being 63s 6d ($15.24). The market was strong and excited, and all the circumstances pointed to a decided further increase. The present quotations are the best for the past two years. At the same time, buyers are acting strictly on the cautious side, and there are no long contracts being entered into. This, however, is in accordance with the attitude also of makers who are shy of heavy contracts. In fact, difficulties of production have never been so great. With regard to the Cleveland position, this advance has taken place without any addition to shipments, which are still on the small side. The rise has actually coincided with the increase in warrant stock, which now stands at 128,000 tons. A great many furnaces have been obliged to go on slack blast, or to stop altogether, through inability to get fuel or ironstone. This is mainly a question of transit, but the coal scarcity already mentioned is now having a direct and sinister effect. Users are wondering where coke prices will go to before they settle. There has been a rise in coke values on the week of 5s ($1.20) to 7s ($1.68), and there is great difficulty in getting supplies. At yesterday's meeting in Birmingham, reports were practically a chorus of complaints covering irregular railway service, difficulty of obtaining materials, scarcity of fuel, insufficiency of labor, while in regard to the character of the service rendered there is general disappointment and complaint at the poor, grudging and often inefficient service rendered by the workpeople. It is stated in all directions that puddlers, furnacemen and millmen are not doing their best to secure a maximum output. In some cases the men plead inferior fuel and apparently there is something in this excuse; but there are also evidences enough of excessive drinking leading to bad timekeeping and neglect of work. The future is regarded with much foreboding, and everybody connected with the iron trade looks forward to a worrying time for the rest of the war period.

Time to Fight

President Leigh Speaks on the Duties of Business Men

E. B. Leigh, president of the Chicago Railway Equipment Co., delivered an address before the Scranton board of trade, Scranton, Pa., March 25, on "The Business Man and the Future; His Duties and Opportunities".

Mr. Leigh said that the company of which he is president holds an annual dinner for officers, stockholders and friends, and this year, realizing that the year just passed did not call for jubilation but rather for serious thought, the customary program was set aside and the evening devoted to the discussion of the all important question of obtaining greater co-operation among business men generally and the promotion of greater interest in the vital questions affecting business. He reviewed at length the speeches made at the February dinner, and in conclusion, said:

"It is time that the business men should take up the fight, and in defense, not only of their very existence, but of the existence, happiness and welfare of the whole people, as well as our further progress as the foremost nation of the world.

"With the future before them, their duties and opportunities recognized, and defined, may the business men of this country be cemented into such an organization as will speak with a voice, not only to be heard, but suggestive of such potent force as will inevitably command heedful and responsive attention."

Federal Bridge Co.—At the annual meeting of stockholders of the Modern Steel Structural Co., the corporation's name was changed to Federal Bridge Co., with main offices and works at Waukesha, Wis. The following officers were elected: C. J. McIntosh, president; J. T. Cheney, vice president; G. W. Helmer, secretary; R. A. Raschig, treasurer; Geo. A. Haynes, chief engineer.

Machine Tool Prices Go Higher

War Demand Leads to Revision of Quotations—Reports of Cancellation of Ammunition Contracts False—Heavy Machinery in Demand at Pittsburgh

SELLERS of machine tools in the Chicago district have received notices from manufacturers of advances in price of 5 to 20 per cent over preceding rates. Usually the advances have not exceeded 5 per cent at a time and the present change is almost unprecedented. One characteristic notification by a manufacturer whose prices have been 12½ per cent off list now quotes some machinery at 5 per cent off, others at list, and still others at 5 per cent above list. This is an increase of 7½ to 17½ per cent. The effect of this change has not yet been felt, but it is thought it will result in comparatively larger sales of cheaper tools to the exclusion of the higher-priced makes. Considerable export demand is still before the trade for figures, and some is being held up on account of prices, buyers apparently believing they can obtain better rates than those now being quoted. One result of this attitude is reflected in a recent transaction where an order for export was filled by a shipment of lathes built for sale at a low price which scarcely can be expected to stand up under heavy demands. Sellers of the better grades of tools are fearful that bad results to the trade in general may follow the shipment of this kind of machinery.

The Santa Fe railroad is still taking figures on its inquiry for a number of tools, but has not yet reached the point of buying. Information is available that the Northwestern and the Burlington systems are busy on specifications for lists of considerable size, but they have not yet seen fit to send out their inquiries. One feature of the market is the purchase of tools, largely second-hand, for use in garages which are being started here and there in Chicago and its vicinity.

Millions of Shells for Foreign Battlefields

DEMAND for machine tools by domestic manufacturers who have booked contracts for war materials has again become extremely heavy. One of the largest of such purchasers is the American Locomotive Co., which has just bought some 500 machines, mostly turret lathes, for turning out several million shells for the Russian government; this company is understood to have closed its contract last week with J. P. Morgan & Co. and the machine tool business was placed without delay. It is understood the Locomotive company still is in the market for miscellaneous requirements. Another large concern in the east is understood to have booked a Russian shrapnel contract which will keep one of its plants busy for some time to come. The Westinghouse Electric & Mfg. Co., which last week was reported as having booked a second shrapnel contract, has closed for a large quantity of machinery in addition to that recently reported purchased. The American Rolling Mill Co., Middletown, O., has taken a shrapnel contract and is understood to be still in the market for at least a portion of the machine tool requirements necessary. Sturgess & Burns, Chicago, have booked contracts for making cartridge cases for both the Russian and the French governments.

There is considerable confusion in regard to the Russian shell contract which was secured by the Canadian Car & Foundry Co. and which was sublet in part to the New York Air Brake Co., the Westinghouse Air Brake Co. and the American Car & Foundry Co. The Canadian and the American concerns have different impressions as to the design of shell to be made and until this matter is settled none of the concerns involved will begin making the shells. In the meantime, closing on large machine tool requirements will be held in abeyance. Incidentally, a number of other concerns who have been figuring on still other subletting of this contract are delayed in making any decisions in this connection. Among concerns which now are figuring on shell or shrapnel contracts are the Spicer Mfg. Co., Plainfield, N. J.; the Barney & Smith Car Co., Dayton, O., and numerous others. The Snead & Co. Iron Works, Jersey City, N. J., which last week was reported as having abandoned negotiations on a French contract, now is figuring on an English contract, it is understood. Charles R. Flint, 25 Broad street, New York, has booked a shrapnel contract and is inquiring for forgings. In addition to the war demand at home there continues an active demand for machine tools for export, largely to the belligerent European powers, but also to countries as yet neutral. This demand involves large quantities of engine lathes, turret lathes, vertical milling machines, cold saws and cutting-off machines. The export demand for grinders and automatics now is not as large as formerly.

Domestic demand for machine tools in the east again shows perceptible improvement. The Morrow Mfg. Co., Elmira, N. Y., has placed some fair orders. A concern in New Brunswick, N. J., another in Trenton, one in Long Island City and one in Paterson, N. J., are buying a few tools each. The Mercer Automobile Co., Trenton, has inquired for a slotter. Two concerns in Philadelphia territory are about to close on fair-sized requirements. New inquiries from eastern railroads are not of great importance. The Delaware, Lackawanna & Western railroad has revised a previous inquiry on a vertical milling machine and is asking for prices on a smaller machine. The Norfolk & Southern is inquiring for a couple of tools. The Memphis street railway, Memphis, Tenn., is in the market for a wheel press. The Lehigh & New England railroad is getting ready to purchase machine tools for its new shops at Pen Argyle, Pa. This company is inquiring for prices on several cranes. A good-sized crane inquiry from the Warren Foundry & Machine Co., Easton, Pa., remains unclosed. Among the cranes purchased in the east since the last issue of *The Iron Trade Review* are the following: One 5-ton Whiting crane by the Hunt Spiller Corporation, Boston; one 20-ton Whiting crane by the Victor Talking Machine Co., Camden, N. J.; one 5-ton and one 10-ton Shaw cranes by Moore Bros. Co., Elizabethport, N. J.; one 10-ton Pawling & Harnischfeger crane by John E. Thropp Sons Co., Trenton, N. J.; one 2-ton crane ordered by Quackenbush & Son, Paterson, N. J., from the Hoisting Machinery Co., New York; one 10-ton, five-motor Northern crane by the Howe Scale Co., Rutland, Vt. Wm. Sellers

Bed Manufacturers, too, Select
Ayer & Lord Interior Wood Blocks

The illustration above shows an "Ayer & Lord" installation in the plant of the Seng Company, Chicago, manufacturer of Portable Beds.

This flooring was installed because a flooring was required that would withstand very rough treatment.

Large iron bars and shapes are being continually dragged across and thrown about this floor.

The assembling of the beds, and the heavy trucking make additional tests of "Ayer & Lord" quality—but in spite of all this, the flooring is giving perfect satisfaction.

Here is what an Ohio man says:

"Replying to your favor of the 17th, regarding wood block flooring, beg to advise that we floored our machine shop, which is approximately 60'x200', with wood block flooring furnished by the Ayer & Lord Tie Co., and while it has only been in use for about one year, it has given excellent results.

"We put a 6" concrete base all over this building and used a sand cushion on top of this, on which the blocks were laid, and then swept a fine sand over the blocks to fill in between them.

"The reason for such a heavy base is that we pile up quantities of heavy castings on the floor."

Write at once for our free booklet "Floors"

Ayer & Lord Tie Company

General Office: Railway Exchange, Chicago

CLEVELAND, OHIO,
926 Illuminating Bldg.
KANSAS CITY, MO.,
1117 Rialto Bldg.
MEMPHIS, TENN.,
1402 Exchange Bldg.
PHILADELPHIA, PA.,
319 Perry Bldg.

& Co., Inc., Philadelphia, have booked an order for a 30-foot, 2-inch plate planer for a government navy yard.

Larger Domestic Orders Bring Enthusiasm

AN encouraging feature in the Cincinnati machinery market is the slow, but constant demand for machine shop equipment from domestic sources. Some of this can be traced indirectly to the European war, as many manufacturers in this country who have received large orders to supply various articles such as shrapnel, automobile trucks, etc., to the warring nations, have found it necessary to enlarge their capacities in order to fulfill their contracts within specified limits. Demand for lathes from European sources continues heavy, but very little new business is being placed, as shops are about booked to full capacities for several months, and one large shop in Cincinnati has sufficient orders to run until the first of next year. Most of these shops cannot take on additional business at the present time, as the contracts they have on hand are for rush work and strictly specify shipments on certain dates with heavy forfeits if these are not complied with. Inquiries for large lists of lathes, such as lots of 100 or more, are constantly before the market, and are almost without exception for foreign delivery. Domestic orders are for much lighter lists. The following lathe manufacturers in Cincinnati are now running full in all departments: The American Tool Works Co., the Lodge & Shipley Machine Tool Co., the R. K. LeBlond Machine Tool Co., the Greaves-Klusman Co., the Bradford Machine Tool Co., the Cincinnati Iron & Steel Co., the Cincinnati Lathe & Tool Co., the Sebastian Lathe Co., and the John B. Morris Machine Tool Co. The Cincinnati Milling Machine Co. has quietly secured some good orders and is now running in all departments. The Cincinnati Shaper Co. is exceptionally busy making parts for milling machines, as very few orders have been received for shapers recently. The Cincinnati Planer Co. and the Cincinnati Bickford Tool Co. are also running at capacity, the former mostly on domestic orders, and the latter on European contracts.

Domestic Influences Felt at Pittsburgh

THERE no longer is any doubt about an improvement in the market for machinery in the Pittsburgh district. Demand for equipment for export continues heavy; concerns filling orders for war material for belligerent European nations are buying lathes and special equipment and there is a noticeable increase in demand from domestic consumers, all of which has made the month just ended one of the most active in more than a year. General contractors are figuring rather prominently for special lines of equipment, and there is some indication that steam railroads may enter at an early date for much-needed machinery. The Youngstown Iron & Steel Co., building a new plant at Youngstown, has awarded contracts for mills and a large part of the electrical equipment; the company now is negotiating for cranes, including one 80-ton and two 25-ton cranes. The Hockingsmith Wheel & Mine Car Co., Penn Station, has awarded contracts for a large machine shop and an addition to its assembling shop and is expected to put out an inquiry for tools at an early date. The Osborne Machine Co., Dubois, Pa., which is installing a foundry, is negotiating for equipment, and the Westinghouse Electric & Mfg. Co. will need considerable foundry equipment if present plans for an extension to the shop at Cleveland are carried out. The Westinghouse company continues to buy equipment for the manufacture of war material. The Schoen Steel Wheel Co. has quietly closed for a half dozen lathes for a similar purpose.

EASTERN STATES

BOSTON. — Boston & Lawrence Bolt & Iron Co. has been incorporated; $25,000 capital stock; by Roland Litchfield, Ella J. Batchelder and Jane A. Hay.

BOSTON.—Work is about to start on a 1-story and basement, 50 x 180-foot building, to be erected in Harrison square, for the Sturdevant Mill Co.

BOSTON.—Boston Armature Works, Inc., has been incorporated; $7,500 capital stock; by John W. Head, Ralph J. and Joseph A. Murphy.

BOSTON.—Architects Simonds, McNaughton & Robinson, 101 Tremont street, are drawing plans for a 2-story light manufacturing building, to be erected on Dent street, by Lyman D. Swett, 183 Perham street, West Roxbury.

CAMBRIDGE, MASS.—Some power equipment will be needed for a $100,000 hospital to be erected by this city.

EAST BOSTON, MASS.—Fire caused about $6,000 damage in the machine shop of the Atlantic Works, 80 Border street.

NEW LONDON, CONN.—Connecticut College for Women will build a 1-story, $30,000 power house.

NEW LONDON, CONN. — New London Ship & Engine Co. is about to start work on a 5-story addition to its plant at Groton.

NORWICH, CONN.—Fire did about $10,000 damage to the Hop river plant of the American Board Co., manufacturer of paper; Mr. Oliner, owner, says the burned section will be rebuilt.

ALBANY, N. Y. — Peter Keller Building Co. has the contract for building a 108 x 146-foot power house, for the Municipal Gas Co. at the foot of Tivoli street.

BROOKLYN.—Generator Valve Co., 294 Taaffe place, will build a $4,000, 1-story, brick factory building.

BUFFALO.—W. A. Case & Son Mfg. Co., 31 Main street, have let the contract for an addition to its plant.

BUFFALO.—Fedders Mfg. Co., 57 Tonawanda street, manufacturer of automobile radiators, will build a 1-story, 112 x 165-foot addition; Architect Peter Wagner, 384 Herman street, is letting contracts.

BUFFALO. — Kaustine Co., sanitary appliances, Ellicott square, will build a 1-story, 60 x 200-foot plant at Perry, N. Y. Architect is W. K. Kidd, Chamber of Commerce building.

BUFFALO.—Councilmen have approved the resolution calling for a bond issue of $250,000 for completion of construction work at Porter avenue pumping station and purchase of lands; it is reported the land will cost about $69,000.

CHADWICKS, N. Y.—Standard Silk Co. is taking bids on 2-story and basement, 106 x 108-foot addition.

LONG ISLAND CITY, N. Y.—Brewster & Co., Bridge Plaza, it is reported, are contemplating going into the manufacture of motor cars.

LONG ISLAND CITY, N. Y.—A. H. Jeter & Co., Inc., roofing and sheet metal contractors, Vernon avenue and Fourteenth street, contemplate erecting a 1-story, 75 x 100-foot building, at the corner of Hancock street and Webster avenue.

NEW BRIGHTON, S. I., N. Y.—Some machine tools will be bought for a manual training school, which St. Peters Roman Catholic Church, is erecting here. Walter Schumm, 225 Fifth avenue, New York, is the architect.

NEW YORK.—Chas. F. Flint, 25 Broad street, has booked a shrapnel contract, and is inquiring for forgings.

NEW YORK.—De Muth & Co., manufacturers of pipes, will erect a $75,000, 4-story, brick addition to their plant at Park avenue and Ashland street, Richmond hill.

NEW YORK.—Coalition Co., motors, engines, machinery, has been incorporated; $8,000 capital stock; by E. Frankel, H. C. Gibson and A Wyse, 570 183d street.

NEW YORK. — Stone-Wood Engineering Corporation has received its charter; $100,000 capital stock; J. T. McGovern, H. F. Karst and J. G. Gregg, 141 Broadway.

NEW YORK, N. Y.— M. George Tigar Bearings Co., automobile bearings, accessories, appliances, etc., has been incorporated; $10,000 capital stock; by Sol Cohen, Annie R. and M. George Tigar, 871 Fox street, Bronx.

NEW YORK. — Delaware, Lackawanna & Western railroad, which among other tools, recently inquired for a vertical miller, has revised its inquiry and now is asking for prices on smaller machine.

NEW YORK.—John J. O'Brien Construction Corporation has received its charter; $50,000 capital stock; by Mayard T. Corkill, Frederick J. Easterbrook and John J. O'Brien, 110 West Eighty-first street.

NEW YORK. — National Lead Co., 111 Broadway, has let contract to Wm. Kennedy Construction Co., 215 Montague street, Brooklyn, for a $50,000 extension to its smelting plant in Brooklyn.

ONEIDA, N. Y.—Oneida Steel Pulley Co.

has increased its capital stock from $300,000 to $500,000.

PENN YAN, N. Y.—Curtis Aeroplane Co., represented by Frank R. Jenkins, is negotiating for the establishment of a branch factory in Penn Yan, employing from 300 to 400 men.

PORT CHESTER, N. Y.—City will take bids shortly on mechanical equipment for sewage disposal plant; Geo. W. Fuller, 170 Broadway, New York, is engineer.

TARRYTOWN, N. Y. — Chevrolet Motor Co., which last June purchased the Kingsland Point plant of the old Maxwell-Briscoe Motor Co., last week purchased the other Maxwell-Briscoe plant on Beekman avenue.

TROY, N. Y.—Fire did about $35,000 damage to the plant of the Burden Iron Co., on South River street.

UTICA, N. Y.—Board of commissioners of common schools, has received bids for technical school and power section addition to Utica Free Academy.

ALTOONA, PA. — Monarch Machine Co. will erect a plant for the manufacture of motor trucks equipped with a new type of engine.

CONNELLSVILLE, PA.—West Penn Traction Co. is increasing boiler capacity at its central station near here; underfeed stokers, charging coal and ash handling equipment, etc. will be installed.

ERIE, PA.—Erie Mfg. Co. contemplates an extension to its plant, plans for which are being prepared.

ERIE, PA.—Work will start about June 1 on the erection of a $100,000 motion picture plant for the Niagara Film Co. on about five acres of land near Meadville, Pa.; plant will consist of a power plant, brick and steel assembly hall, etc.

ERIE, PA.—H. E. Barr, engineer, has completed plans for the Electrical Materials Co.'s proposed plant to be erected in Erie by C. C. Hertzel and others of North East, Pa. Steel frame, tile and brick construction will be used for a machine shop, 35 x 125-feet; forge shop 40 x 90 feet and power house, 24 x 66 feet.

ERIE, PA.—Surveys have been completed and preliminary supplies purchased for the construction of two electric lines centering from Erie. Southeast of Erie, a line is projected through Wattsburg, Findley Lake, Sherman, Panama, towns without trolley service, to Lakewood and Jamestown, N. Y. In the southwest another company is starting an electric line, making a short run between the summer parks of Lake Erie and Exposition Park at Conneaut Lake. H. C. Allen is conducting negotiations. The lines represent 65 to 70 miles of trackage.

HARRISBURG, PA.—Harrisburg Pipe & Pipe Bending Co., which is busy on shrapnel work, has awarded contracts for the erection of additions to its plant.

HARRISBURG, PA.—Merchants Ice Co. has purchased property on Berryhill street and will erect a large ice manufacturing plant this spring.

PENN STATION, PA. — Hockingsmith Wheel & Mine Car Co. has awarded a contract to the Riter-Conley Mfg. Co., Pittsburgh, for the erection of an addition to the assembling shop and for a new machine shop, 90 x 90 feet; the contract will involve about 150 tons of steel; considerable new equipment will be purchased.

PHILADELPHIA.—Victor Metal Co. has been incorporated; $5,000 capital stock; by S. J. Lloyd, F. R. Hansell, Philadelphia; George H. B. Martin, S. C. Seymour, Camden, N. J.

PHILADELPHIA. — The commanding officer at Frankford Arsenal, is taking bids till April 12 on a press shop extension, 1-story, 55 x 110 feet.

PHILADELPHIA.—W. W. Lindsay & Co., Harrison building, have the general contract for erecting $25,000 plant at Eighteenth and Cambria streets, for Linde Air Products Co., which has offices in the Forty-second street building, New York.

PHILADELPHIA.—Wm. & Harvey Rowland, Inc., manufacturer of steel springs, have let contracts to H. Burrell, 206 South Quince street, for a 1-story, 50 x 275-foot addition to the plant at Tacony and Lewis streets, Frankfort.

PITTSBURGH. — Allegheny By-Product Coke Co., the incorporation of which previously was mentioned, will have its headquarters at Otto, Pa., between McKeesport and Glassport, where a by-product coke oven plant will be operated. A benzol plant may be erected. T. V. Salt is vice president and general manager of the company.

PITTSBURGH. — Gas Appliance Mfg. Co. has been incorporated; $5,000 capital stock; by Alexander P. Lindsey, John C. Sheriff and Welker E. Galbriath.

PITTSBURGH.—Robert Grace Construction Co., this city, has been awarded a contract for a concrete bridge over the Susquehanna river at Harrisburg, Pa., for the Cumberland Valley Railroad; the bridge will be 4,000 feet long and will contain 56,000 cubic feet of concrete.

PITTSBURGH. — The board of inspectors, Western Penitentiary, Northside, will receive bids until April 7 for the following equipment: Hoisting engine; concrete mixer; wire cable; additional equipment for increasing capacity of limestone and sandstone crushing plants; industrial locomotive; industrial cars and track equipment; quarry equipment, including air compressors, drills, etc.

POTTSTOWN, PA.—Robert A. Feroe is having plans drawn for a 2-story, brick building at Charlotte and Water streets to be used for factory purposes.

POTTSTOWN, PA.—L. F. Shoemaker & Co., which last week was mentioned as a purchaser of machine tools and as still being in the market for some cranes and other equipment, will erect an 80 x 100-foot addition.

ROYERSFORD, PA.—Cann & Saul, manufacturers of plumber's supplies, will erect a large addition to their plant; the company will institute the drop forge method of manufacturing many of its articles.

SCRANTON, PA.—F. H. Emery Co., mining machinery, has been incorporated; $5,000 capital stock; by Thomas R. Highes, F. H. Emery, Ida B. Emery.

SOUTH BETHLEHEM, PA. — Lehigh & New England railroad is in the market for several cranes for its new shops at Pen Argyle, Pa.

WARREN, PA.—Warren Axe & Tool Co. will install new equipment in a 100 x 100-foot addition to its plant; equipment includes a large press to punch eye holes in axe heads.

HIGHLAND PARK, N. J. — Unshrinkable Metal Co. has been incorporated; $25,000 capital stock; by G. L. and E. H. Snediker, Highland Park; Melvin Stephens, N. Y.

JERSEY CITY, N. J.—Snead & Co. Iron Works, which last week was reported as having given up figuring on a shrapnel contract for Russia, now is understood to be figuring on another shrapnel contract.

PATERSON, N. J.—Quackenbush & Son, 122 Van Houten street, is having drawn plans for a 2-story, 40 x 129-foot addition to carriage factory.

PLAINFIELD, N. J.—Spicer Mfg. Co. is figuring on a contract for making shrapnel shells.

TRENTON, N. J.—Mercer Automobile Co. is in the market for a slotter.

TRENTON, N. J.—People's Service Electric Co., manufacturer of electrical appliances, has been incorporated; $125,000 capital stock; by C. B. Lasell, Trenton.

WILMINGTON, DEL. — Architect R. C. Tindal, Equitable building, Wilmington, again is taking bids on a 2-story and basement, 50 x 80-foot addition, for the National Machine Co.

WASHINGTON.—Bureau of supplies and accounts, navy department, is receiving bids till April 6 for a 4-horsepower shunt wound motor for the Washington navy yard.

WASHINGTON.—A business man in Russia has desire to be put in touch with American manufacturers of aeroplanes and motors therefor; address bureau of foreign and domestic commerce for further information.

Westinghouse Activity in Cleveland

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., shortly will dismantle its light work foundry located on the North Side, Pittsburgh, and the castings heretofore made in this plant will be produced at the company's shop in Cleveland. A large part of the heavy work now being made at the Cleveland foundry will be manufactured at the Westinghouse Machine Co.'s casting plant at Trafford City, Pa. Some heavy work also will be made at the Cleveland plant, but to a large extent this shop will be devoted to light work. At the Cleveland plant one of the foundries will be torn down to provide a site for an 8-story pattern warehouse, 70 x 200 feet. Contracts for this building will be awarded by the engineering department at East Pittsburgh.

The Cleveland foundry, located on West Fifty-eighth street, will be arranged to operate on the continuous basis by the grating, shake-out and sand conveyor system. Iron will be melted throughout the day and the molds will be poured as rapidly as they are made. The castings will be shaken-out on their respective floors, the sand being dropped through a grating into a sand conveyor in a basement underneath the shop. In this basement the sand will be cooled and tempered for delivery to the molding floors. The number of cupolas in this shop will be reduced from seven to five, although by this continuous system of operation the output will continue practically the same as in the past, which approximates about 2,000 tons per month. The cleaning equipment also will be greatly extended by the installation of additional sand blast machines and tumbling barrels.

CENTRAL STATES

CANAL FULTON, O.—Fulton Pit Car & Mfg. Co. has increased its capital stock from $100,000 to $150,000.

CANTON, O.—Canton Sheet Steel Co. has increased its capital stock from $500,000 to $2,000,000.

CINCINNATI.—Matthew Addy Co., iron, coal, coke, has been incorporated; $100,000 capital stock; by James A. Green, Louise Coy Green, Benjamin N. Ford, A. Burt Champion and Leland G. Banning.

CLEVELAND.—Work will start this spring on the Chardon, Jefferson, & Meadville electric line connecting with the Cleveland & Eastern at Chardon.

CLEVELAND.—Monmouth Machine Co. has been incorporated; $10,000 capital stock; by E. H. Rooke, E. P. Schlosser, W. C. Kelly, H. I. Emerson, and Monroe Curtis.

CLEVELAND. — Geometric Stamping Co., has been incorporated to manufacture stamped, cold forged and other articles; $10,000 capital stock; by Carl S. Fetzer, R. M. Spitalsky, J. G. Fetzer, Augustus W. Bell, F. A. Kovanda.

CLEVELAND.—Samuel Austin & Son Co., engineers and builders, is drawing plans for the Frantz-Premier Mfg. Co.'s proposed $150,000, 4-story, 60 x 250-foot, fireproof plant, to be erected on Ivanhoe road; bids will be asked shortly.

CLEVELAND. — American Ship Building Co. will locate its office and all the Cleveland plants of the company at the old Globe shipyard at the foot of West Fifty-fourth street. Three new buildings to cost about $160,000 are planned as follows: A 120 x 320-foot foundry and machine shop; a 100 x 200-foot, 2-story pattern shop and pattern storage building; 60 x 100-foot, 3-story office building; all structures will be of brick and reinforced concrete. Edward Smith, R. L. Ireland and Alfred G. Smith were appointed a committee to take charge of the matter and it is expected contracts will be awarded shortly.

COLUMBUS, O.—Avery & Loeb Electric Co. has been incorporated; $100,000 capital stock; by Oscar Avery, C. W. Hammond, A. E. and A. W. Loeb, A. L. Frey.

COLUMBUS, O.—Service Director Boardman, reports the approximate cost of constructing a viaduct in Poplar avenue, which will be voted on at the November election, will be $300,000, exclusive of the property to be purchased.

CORTLAND, O. — Cortland Lighting Co., electricity, power, heat, light, etc., has been incorporated; $5,000 capital stock; by O. M. Richards, J. G. Gates, R. H. Wilkinson Jr., Charles Fillius and N. E. Richards.

CUYAHOGA FALLS, O.—Falls Clutch & Machinery Co. has increased its capital stock from $1,000 to $70,000.

DAYTON, O.—Barney & Smith Car Co. is figuring on a shrapnel contract.

EAST LIVERPOOL, O.—Thomas Toby, Detroit, is considering sites at Klondyke, O., and other points on the Lincoln highway for the establishment of a machine shop specializing in automobile parts.

ELYRIA, O.—J. M. Powell, county bridge engineer, is making plans for two steel bridges, one in Wellington township, 84-foot span, and one in Black river township, 60-foot span.

FINDLAY, O.—Toledo-Ford Tire Co. has announced its main factory will be located in Findlay and that preparations are being made to erect a 50 x 400-foot addition to the present factory on Lima avenue.

FOSTORIA, O.—Seneca Wire & Mfg. Co. will erect a $20,000 addition to its plant this spring.

FOSTORIA, O.—Fostoria Factories Co. has been incorporated at $50,000 among local business men to take over the vacant plant of the Central Electrical Co. as a general industrial plant.

HAMILTON, O. — County commissioners will receive bids April 17 for the Woodsdale bridge, 600-foot span, estimated to cost $85,750. The commissioners also have ordered the engineers to prepare plans for the rebuilding of the Columbia bridge, which will make it 730 feet long and 22 feet wide.

MASSILLON, O.—Central Steel Co. will erect office and laboratory buildings, 40 x 100 feet and 40 x 60 feet, respectively, contracts for which have been let.

MIDDLETOWN, O. — American Rolling Mill Co. has booked a shrapnel contract and is buying equipment for turning out this material.

MINSTER, O. — Cummings Machine Co., concrete mixers, engines, machinery, has been incorporated; $50,000 capital stock; by C. R. Dickman, Frank Schmuecker, J. F. Kramer, F. J. Thieman and Ben Sommer.

PIQUA, O.—French Oil Machinery Co. is building a 1-story addition to its foundry building on West Greene street.

PORTSMOUTH, O.—Work has begun on the extension to the Portsmouth plant of the Whitaker-Glessner Co., Wheeling, W. Va.; a new bar mill, heating furnaces and an extension to the galvanizing department are included in the program.

TIFFIN, O.—Andrew P. Keller Machine Co., South Washington street, has purchased property for the erection of two buildings, one 21 x 50 feet and the other 26 x 32 feet, of vitrified brick.

TOLEDO, O.—Commissioners will construct a bridge over the ravine, west of Island avenue.

TOLEDO, O.—International Harvester Co. is planning a plant costing about $200,000, to be erected at 348 South Erie street.

TOLEDO, O.—Mather Spring Co. is building a $20,000 addition to its plant on Castle boulevard and the Lake Shore tracks.

TOLEDO, O.—H. J. Spieker Co. is at work on a $17,000 addition to the Auburndale plant of the National Supply Co.; it will be 1-story, 330 feet long, of steel and brick construction.

TOLEDO, O.—A plant is being erected by the Gotshall Mfg. Co., a hardwood concern, to replace the plant recently burned. It will be enlarged and a new saw mill will be erected.

TOLEDO, O.—Ohio Plate & Window Glass Co., glass, metal work, has been incorporated; $35,000 capital stock; by Paul Heymann, W. Clarke Furman, Louis William Keefe, Clarence C. Anderman, Edwin G. Richardson.

WARREN, O.—W. R. Harrington, county auditor, will open bids April 12 for the erection of the South Main street bridge in Hubbard, O.; plans with the county surveyor, county auditor and county commissioners; certified check for $100 required.

YOUNGSTOWN, O.—Youngstown Iron & Steel Co., which is building an open hearth steel plant, continues to place contracts for equipment. Inquiries have been sent out for an 80-ton ladle crane, two 25-ton traveling cranes and a special ingot charging crane. The General Electric Co., Schenectady, N. Y., has been awarded a contract for a 2,000-horsepower induction motor to drive the slab and bar mills, a 500-kilowatt motor-generator set and three secondary transformers with switchboard to serve all the electrical equipment, part of which has not yet been ordered.

CHARLESTON, W. VA. — Consumers' Power Co., light and power, has been incorporated; $50,000 capital stock; by August W. McDonald, O. P. Fitzgerald, L. G. Summerfield, John Wehrle and George S. Couch Jr.

CHARLESTON, W. VA.—Becker Steel Co. of America, with headquarters in New York City and works at Charleston, has been incorporated in West Virginia; $750,000 capital stock; by Wilhelm Peters, Adolf J. Becker, Max Koch, Wylie C. Margeson and Henry F. Harnidge, of New York City.

MARTINSBURG, W. VA. — Municipal Shale Brick & Block Co. contemplates the erection of a $100,000 plant for the manufacture of bricks, fireproofing materials, etc.; J. W. Candler, superintendent, is in charge of the work.

MORGANTOWN, W. VA.—Crawford Motorcycle Co., manufacturer, has been incorporated; $50,000 capital stock; by Frank Cox, J. L. Keener, E. M. Everly, Glenn Hunter and E. A. Crawford.

WHEELING, W. VA.—Steam-Electric Engineering Co., electrical energy, has been incorporated; $25,000 capital stock; by F. J. Ballesteon, H. E. Newman, Frank E. Finnegan, E. E. Smith and H. M. Walmsley.

ASHLAND, KY.—Norton Iron Works will build a 5-story, steel addition which will be equipped for the manufacture of field fencing.

BURGIN, KY.—Clell Coleman recently has purchased a building and it is reported that he will use it for an electric light plant and ice factory.

CAMPBELLSVILLE, KY. — L. B. Smith has purchased the woolen mill of the Campbell Mfg. Co. and will equip it for operation.

CANEYVILLE, KY.—Edward Butler, county road engineer, will receive bids until April 27 for an 85-foot bridge over Bear creek.

CLAY, KY.—Melton & Melton, who operate the local electric light plant, will extend lines to Dixon, Corydon, Cadiz, Sebree and other towns, making considerable enlargements necessary.

COVINGTON, KY.—The city will spend $200,000 in the construction of a 24-inch water main, 3½ miles long. George Hornung, Newport, Ky., is the engineer.

ELKHORN CITY, KY.—With the completion of a railroad from Danta, Va., the Elkhorn Coal & Fuel Co. is preparing large development work, and its engineers now are laying out plans for the construction of mining plants.

HAZARD, KY.—Hazard Power Co., recently incorporated at $25,000, is remodeling an old lighting plant; address L. L. Stone.

HOPKINSVILLE, KY.—Hopkinsville Bottling Co., E. E. Overshiner, manager, is equipping a plant.

LOUISVILLE, KY.—Modern Woodworking Co. is completing the equipment of its plant at 1106 West Main street and is in the market for a sander, tenoner, saw, etc.; address Frank H. Hillerich.

LOUISVILLE, KY.—G. C. Beckwith, manager of the Premier Asphalt Co., and E. V. Uncaper, Marion, O., chief engineer of the company, are considering sites in Louisville for the location of a $150,000 plant.

OWENTON, KY.—It is reported W. E. Arnold, operating a flour mill and electric light plant, is planning the installation of a 30-horsepower oil engine.

PADUCAH, KY.—Illinois Central railroad, general offices in Chicago, is reported to have plans for the enlargement of its repair shops in Paducah.

PADUCAH, KY.—Paducah Water Co. will spend $14,000 on improvements to its plant, including laying a considerable number of new mains.

PIKESVILLE, KY.—Pikesville Supply & Planing Mill Co. has been incorporated; $15,000 capital stock; J. E. Pauley, M. C. Justice, J. L. Morgan, J. E. Ratliff, John Thacker and Hi. Pauley.

PINE TOP, KY.—Tandy Martin has purchased a tract of hardwood timber and plans the erection of a sawmill.

PRESTONSBURG, KY. — Prestonsburg

Electric Light Co. will construct a transmission line from Van Lear, Ky., to Prestonsburg, a distance of eight miles.

WOODS, KY.—Floyd Mining Co., Emma, Ky., will establish an electric light plant and will need a boiler, engine, generator, switchboard, etc.; Henry L. Coe, buyer.

HUNTINGTON, IND.—County commissioners have approved plans prepared by J. B. Vernon, county surveyor, for five bridges and a culvert to be erected this summer.

INDIANAPOLIS.—Electric Furnace Co. of America, manufacturer, has been incorporated; $30,000 capital stock; by H. H. Buckman Jr., G. A. Pritchard and T. E. Buckman.

NEW CASTLE, IND.—Rex Casket Hardware Co. has been incorporated; $10,000 capital stock; by Howard H. Boar, Harry Burris and William M. Goodwin.

PENDLETON, IND. — W. O. McVaugh, Anderson, Ind., is preparing plans for a 100-foot, 4-span, reinforced concrete bridge over Fall Creek; bids will be asked April 1.

CHICAGO.—Sturgess & Burns have booked contracts for making cartridge cases for the French and Russian governments.

CHICAGO.—Warner Forge & Machine Co. has been incorporated to operate a forge and machine shop, $10,000 capital stock; by John L. Pearson, L. M. Brenner and Walter D. Herrick, 29 South La Salle street.

CHICAGO.—Portable Power Mfg. Co. has been incorporated to manufacture gasoline engines; $2,500 capital stock; by T. Behr, Herbert M. Lautmann and I. Karl Davidson, 30 North La Salle street.

CHICAGO.—M. J. Strand Sons & Co. has been incorporated to manufacture structural steel and iron; $12,000 capital stock; by Hugo V. Strand, M. J. Strand and Frank L. Hrubes.

CHICAGO.—Uni-Motion Door Handle Co. has been incorporated to manufacture builders' hardware; $2,400 capital stock; by George F. Lovedall, John A. Stratker and W. M. Harrison, 1739 North Forty-first street.

QUINCY, ILL.—Hayton Pump Co., Stationer's Mfg. Co. and Dick Magneto Co., all three plants housed in the same building, suffered in the aggregate about $100,000 loss by fire.

BATTLE CREEK, MICH.—American Steel Adjustable Screen Door Co. has been incorporated; $50,000 capital stock; E. D. Fitzpatrick, Marinette, Wis., holds the patent.

CHEBOYGAN, MICH.—Company is considering Cheboygan as a location for a marine engine plant, according to V. S. Moloney, of the chamber of commerce.

DETROIT.—Peninsular Smelting Co. has been incorporated; $25,000 capital stock; by Max and Minnie Stotter, Myrtle Poole.

SOUTHERN STATES

NORFOLK, VA. — Norfolk & Southern railroad is inquiring for a few machine tools.

BIRMINGHAM, ALA.—Frank A. Dudley, Buffalo, says work probably will begin in the fall on the erection of a $500,000 cotton mill in Birmingham, which will be backed by Birmingham and Buffalo capitalists; no details of the plans have been given out.

HEMPSTEAD, TEX.—Hempstead Business League and citizens from Austin county are considering rebuilding the bridge across the Brazos river which connects Austin and Waller counties.

CAMDEN, ARK.—W. F. Arms, representing a Los Angeles wood manufacturing company, is promoting the establishment of a flooring factory in Camden.

CHATTANOOGA, TENN. — Chattanooga Box & Lumber Co's plant may be equipped for the manufacture of excelsior; address Charles Reif, president.

KNOXVILLE, TENN.—State legislature is considering a bill authorizing Knoxville to issue $500,000 bonds for waterworks improvements.

KNOXVILLE, TENN. — John G. Duncan

SOMETHING SELLERS SHOULD SEEK

HERE is the kernel of the week's live new business items. This column contains items you cannot afford to overlook, arranged in handy form for the convenience of busy executives. If your time is limited, look for this column in every issue.

American Ship Building Co. will locate its office and all of the Cleveland plants of the company at the old Globe shipyard at the foot of West Fifty-fourth street, Cleveland. Three new buildings to cost about $160,000 are planned as follows: A 120 x 320-foot foundry and machine shop; a 100 x 200-foot, 2-story pattern shop and pattern storage building, and a 60 x 100-foot, 3-story office building; all structures will be of brick and reinforced concrete. Edward Smith, R. L. Ireland and Alfred G. Smith have been appointed a committee to take charge of the matter and it is expected contracts will be let shortly.

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Hockingsmith Wheel & Mine Car Co., Penn Station, Pa., has awarded a contract to the Riter-Conley Mfg. Co., Pittsburgh, for the erection of an addition to the assembling shop and for a machine shop, 90 x 90 feet; considerable new equipment will be purchased.

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Warren Axe & Tool Co., Warren, Pa., will install new equipment in a 100 x 100-foot addition to its plant, including a large press to punch eye holes in axe heads.

Norfolk & Southern railroad is inquiring for a few machine tools.

Mercer Automobile Co., Trenton, N. J. is in the market for a slotter.

Lehigh & New England railroad is in the market for several cranes for its shops at Pen Argyle, Pa.

Memphis Street Railway, Memphis, Tenn., is in the market for a wheel press.

Co. is inquiring for a second-hand engine lathe, with a 6 to 8-foot bed and 12 to 16-inch swing.

MARYVILLE, TENN.—The city now is prepared to let contracts for a $50,000 water system, following the approval of a bond issue for that purpose. R. C. Huston & Co., Memphis, Tenn., are engineers.

MEMPHIS, TENN.—Memphis Street Railway is in the market for a wheel press.

SHELBYVILLE, TENN. — Tennessee Valley Power Co.'s plant, which was burned recently with $15,000 loss, will be rebuilt.

SHELBYVILLE, TENN.—Shelbyville electric light and power plant, recently purchased by the Tennessee Valley Power Co., suffered about $12,000 loss by fire; the machinery was badly damaged.

TRIMBLE, TENN.—J. W. Dulin plans the construction of an electric light and water system.

WESTERN STATES

WICHITA, KAN.—J. P. Becker has purchased the patent rights of a gas machine which now is made in Minnesota and has received plans for a 2-story, brick factory for its manufacture.

HELENA, MT.—It is reported the Keating Gold Mining Co. will construct a railroad from Toston to Radersburg, a distance 14 miles, work to begin about June 15 and cost about $150,000; gasoline-propelled engines will be used as motive power.

DENVER, COLO.—Armour Packing Co., which it is said has acquired areas of potash bearing land near Marysvale, Utah, will erect works estimated to cost about $3,000,000; J. Ogden Armour was in Denver recently to discuss with electrical engineers the company's plans for building a central power plant and equipping an aerial tramway to convey the material from the mines to the railroad, some 10 miles distant.

BELLINGHAM, WASH.—Contract for construction of Guide-Meridian bridge, Whatcom county, has been awarded to the Weymouth Construction Co. at $30,713.

BELLINGHAM, WASH.—Fred J. Wood, of the E. K. Wood Lumber Co., and others have formed a company to work the Excelsior mine near Glacier; it is proposed to begin at once the construction of a cyanide plant.

ELLENSBURG, WASH. — Reuben Crimp, city clerk, will receive bids until April 5 for the construction of a power plant building, including steam turbine condenser, water pump, boiler, water wheel governor, wiring, etc.; cost about $55,000; plans are on file with the city engineer.

EVERETT, WASH.—Bids will be received by county commissioners until April 12 for the construction of a concrete culvert and fill or a steel viaduct on the Pacific highway near Marysville.

HOQUIAM, WASH.—City will construct a $45,000 draw bridge at Simpson avenue; Charles Evan Fowler, Central building, Seattle, will prepare plans.

SEATTLE.—Utilities committee of the council has recommended a bill for passage which will appropriate $25,000 from the steam plant bond issue for the installation of an additional boiler at the Lake union steam plant.

ROSEBURG, ORE.—Henry Richardson and others are seeking to secure the construction of a sawmill in Roseburg.

LOS ANGELES.—Neptune Meter Co., with headquarters at New York City and a factory at Long Island City, will erect a 5-story, 112 x 132-foot, reinforced concrete plant at the northeast corner of Third and Alameda streets; plans for the building, which will cost about $135,000, have been drawn by John F. Blee, architect; J. R. Barker, San Francisco, is western representative.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery to July 1.)

Bessemer, valley	$13.60
Bessemer, Pittsburgh	14.55
Basic, Pittsburgh	13.45
Basic, eastern Pa.	14.00
Malleable, Pittsburgh	13.80 to 14.45
Malleable foundry, Chicago	13.00
Malleable foundry, Philadelphia	15.00 to 15.25
Malleable foundry, Buffalo	12.00 to 12.50
No. 1X foundry, Philadelphia	14.54 to 14.79
No. 2 foundry, Pittsburgh	13.80 to 14.45
No. 2 foundry, valley	13.00 to 13.50
No. 2 foundry, Cleveland	13.25
No. 2 foundry, Ironton	12.75 to 13.00
No. 2 foundry, Chicago	13.00
No. 2X foundry, Philadelphia	14.29 to 14.54
No. 2X fdy., N. J. tidewater	13.84 to 14.25
No. 2X foundry, Buffalo	12.00 to 12.50
No. 2 plain, Philadelphia	14.00 to 14.25
No. 2 plain, N. J. tidewater	13.84 to 14.10
No. 2 plain, Buffalo	11.75 to 12.00
No. 2 southern, Birmingham	9.25 to 9.75
No. 2 southern, Cincinnati	12.15 to 12.65
No. 2 southern, Chicago	13.50 to 14.00
No. 2 southern, Phila. delivery	14.00 to 14.25
No. 2 southern, Cleveland	13.25 to 13.75
No. 2 south'n, New York, docks	13.75 to 14.00
No. 2 southern Boston, docks	13.75 to 14.00
No. 2 south. interior, New Eng.	14.50 to 15.50
No. 2 southern, St. Louis	12.90 to 13.40
Virginia No. 2X furnace	12.50
Virginia 2X, Philadelphia	15.25
Virginia 2X, Jersey City	15.50
Virginia 2X, Boston points	15.75
Gray forge, eastern Pa.	13.25 to 13.50
Gray forge, Pittsburgh	13.45 to 13.70
Gray forge, Birmingham	8.75 to 9.00
Silveries, 8 per cent, Jackson, O.	14.75 to 15.25
Silveries, 5 per cent Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phil.	19.00 to 20.00
Lebanon low phos., furnace	16.00 to 16.50
Low phos., Pittsburgh	20.95 to 21.20
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	15.75 to 17.00
Charcoal, Birmingham	25.00

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.50
Old range, non-Bess., 51½ per cent	3.00
Mesabi non-Bessemer, 51½ per cent	2.85

(Per unit Philadelphia.)

(Prices nominal.)

Foreign Bess., 50 to 65 per cent.	7½c to 8½c
For'n non-Bes., 50 to 65 per cent	7¼c to 8½c

COKE

(At the ovens)

Connellsville furnace	$1.50 to 1.65
Connellsville fur. contr.	1.65 to 1.75
Connellsville foundry	2.00 to 2.40
Connellsville fdy. contr.	2.25 to 2.50
Wise county furnace	1.75 to 2.00
Wise county foundry	2.10 to 2.40
Pocahontas furnace	1.75 to 2.00
Pocahontas foundry	2.00 to 2.25
New River, foundry	2.50 to 3.00
New River, furnace	2.00 to 2.25

FERRO-ALLOYS

Ferro-mang., Balti. (prompt)	$90.00 to 100
Ferro-mang. (future), Balti.	78.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent	20.00
Ferro-sil., 11 to 12 per cent	19.00
Ferro-sil., 10 to 11 per cent	18.00
Ferro-sil., 9 to 10 per cent	17.00

(Ferro-silicon quoted at furnace Ashland, Jackson and New Straitsville)

Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Open hearth billets, Phila.	$21.56 to 22.56
Forging billets, Phila.	24.56 to 25.56
Forging billets, Pbgh.	24.00 to 24.50

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.45
From Pittsburgh	.619
From Youngstown	.639
From Niles	.619
From Wheeling	.619
From Steubenville	.619
From Johnstown	.604
From Coatesville	.545
From Steelton	.555
From Bethlehem	.529
From Cleveland	.65
From Chicago	.765

Rates on sheet mill products $2 per ton higher.

Wire rods, Pittsburgh	$25.00 to 26.00
Billets, Pittsburgh	19.50 to 20.00
Billets, Youngstown	18.50 to 19.00
Sheet bars, Pittsburgh	19.00 to 19.75
Sheet bars, Youngstown	18.50 to 19.25

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Lgt. rails, 8-lbs., Pbgh. & Chgo.	1.22c
Lgt. rails, 12 lbs., Pbg. & Chgo.	1.17c
Lgt. rails, 16 to 20 lbs., Pgh. & Chgo.	1.12c
Lgt. rails, 25 to 45 lbs., Pbgh. and Chgo.	1.07c
Relaying rails, standard, Pbgh. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect. Pbgh. base.	1.50c
Angle bars, st. sections, Chicago	1.50c
Spikes, railroad, Pbgh.	1.35c to 1.40c
Spikes, railroad, Chgo.	1.50c
Track bolts, Pbgh.	1.85c
Track bolts, Chgo.	2.00c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	3.00
New England	3.00
Philadelphia	2.79
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.00 to 1.50
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (rail and water)	4.25
Philadelphia (all rail)	5.20
Philadelphia (rail and water)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago, to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.47
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.10c to 1.15c
Structural shapes, Chicago	1.29c to 1.34
Structural shapes, Philadelphia	1.259c to 1.309c
Structural shapes, New York	1.269c to 1.319c
Struc. shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.24c to 1.29c
Tank plates, Pittsburgh	1.05c to 1.15c
Tank plates, Philadelphia	1.259c to 1.309c
Tank plates, New York	1.269c to 1.319c
Bars, soft steel, Pittsburgh	1.15c to 1.20c
Bars, soft steel, Chicago	1.34c
Bars, soft steel, Philadelphia	1.259c to 1.309c
Bars, soft steel, New York	1.269c to 1.319c
Hoops, carloads, Pittsburgh	1.25c to 1.30c
Bands, Pittsburgh	1.15c
Shafting, Pbgh., carloads, disc. 69 to 70 per cent	
Bar iron, Chicago	1.15c
Bar iron, Philadelphia	1.125c to 1.175c
Bar iron, New York	1.125c
Bar iron, Cleveland	1.25c
Bar iron, Pittsburgh	1.10c to 1.15c
Hard steel bars, Chicago	1.20c to 1.25c
Smooth finish, mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.80c to 1.90c
No. 28, black, Chicago	1.94c to 1.90c
No. 28, tin mill, black, Pbgh.	1.85c to 1.90c
No. 28, galvanized, Pbg., (nom.)	3.30c to 3.40c
No. 28, galvanized, Chgo. (nom.)	3.59c
No. 10, blue, annealed, Pbgh.	1.30c to 1.35c
No. 10, blue, annealed, Phila.	1.459c to 1.509c
Tin plate, 100 lb., coke base nom.	3.10c to 3.35c

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold roll, and re-anl.	30 cents
Hot roll'd pickl'd and anl., tin mill	25 cents
Full pickl'd, cold rolled and re-anl.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller leveling	10 cents
Patent leveling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxidizing	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free from mill scale	55 cents
Special open hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black.	Galv.
	Butt-weld.	
Steel, ⅜ to 3 inches	80	69½
Iron, ⅜ to 2½ inches	70	59
	Lap-weld.	
Steel, 2½ to 6 inches	79	68½

BOILER TUBES

Steel, 3½ to 4½ inches	74
Iron, 3½ to 4½ inches	60

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

Wire nails, jobbers, Pittsburgh	$1.60
Plain wire, jobbers, Pittsburgh	1.40
Galvanized wire, jobbers, Pbgh.	1.90
Polished staples, Pbgh.	1.60
Galvanized staples, Pbgh.	2.10
Barb wire, painted, jobbers, Pbgh.	1.60
Barb wire, galv., jobbers, Pbgh.	2.10

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 80 and 15; cut threads 80 and 10; larger or longer, 75 and 15.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter, rolled 80 and 20; cut, 80 and 15; larger or longer, 80.

Gimlet and cone point lag or coach screws, 85 and 2½.

Hot pressed square, blank or tapped nuts, $6.40 off list; hot pressed hexagon blank or tapped, $7.30 off.

Cold pressed, square, blank or tapped, $6.10 off; hexagon, blank or tapped, ⅝ inch and larger, $7.50; ⅛-inch and smaller, $8.00.

RIVETS

Structural rivets, Pbgh	1.45c to 1.50c
Structural rivets, Chgo	1.68c
Boiler rivets, Pbgh	1.55c to 1.60c
Boiler rivets, Chgo	1.78c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

COLD ROLLED STRIP STEEL

(Subject to regular extras.)

0.10 to 0.19 Carbon.	Base price Cut to length Hard.	Soft.
1½ inch and wider	2.85	3.10
0.100 and thicker	2.95	3.20
0.050 to 0.099 inc.	3.10	3.35
0.035 to 0.049 inc.	3.35	3.75
0.031 to 0.034 inc.	3.60	4.00
0.025 to 0.030 inc.	3.80	4.20
0.020 to 0.024 inc.	4.70	5.20
0.017 to 0.019 inc.	5.10	5.60
0.015 and 0.016	5.95	6.45
0.013 and 0.014	6.55	7.05
0.012	6.90	7.40
0.011	7.25	7.75
0.010	Coils.	
0.100 and thicker	2.75	3.00
0.050 to 0.099 inc.	2.80	3.05
0.035 to 0.049 inc.	2.95	3.20
0.031 to 0.034 inc.	3.10	3.50
0.025 to 0.030 inc.	3.20	3.60
0.020 to 0.024 inc.	3.30	3.70
0.017 to 0.019 inc.	3.60	4.10
0.015 and 0.016	4.00	4.50
0.013 and 0.014	4.70	5.20
0.012	5.05	5.55
0.011	5.40	5.90
0.010	5.75	6.25

CAST IRON WATER PIPE

Six to 48-in., Cleveland	23.75
Four-inch, Chicago	26.00
Six to 12 inches, Chicago	24.00
Large sizes, Chgo	23.00
Six-inch, New York	20.50 to 21.50
Four-inch, New York	21.50 to 22.50
Four-inch, Birmingham	19.50
Six-inch and larger, Birmingham	19.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.75c to 1.80c
Steel bars, Philadelphia	1.65c to 1.70c
Steel bars, New York	1.80c
Steel bars, St. Louis	1.70c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.70c to 1.80c
Iron bars, Philadelphia	1.60c to 1.65c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.85c to 1.90c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia	1.65c to 1.70c
Shapes and plates, New York	1.85c
No. 10 blue anl. sheets, Chgo	1.95c
No. 10 blue anl. sheets, Cleve	2.05c
No. 10 blue anl. sh. St. Louis	2.00c
No. 10 blue anl. sheets, Cinci	2.00c
No. 28 black sheets, Chgo	2.55c
No. 28 black sheets, Cleveland	2.45c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 black sheets, St. Louis	2.55c
No. 28 galv. sheets, Chgo	3.75c
No. 28 galv. sheets, Cleveland	3.50c
No. 28 galv. sheets, Cincinnati	3.40c to 3.55c
No. 28 galv. sheets, St. Louis	3.75c

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo	$ 8.75 to 9.25
No. 1 railroad wrought, Cleve	9.75 to 10.00
No. 1 railroad wrought, St. L	8.50 to 9.00
No. 1 railroad wrought, Cincin	8.00 to 8.50
No. 2 railroad wrought, Chgo	8.50 to 8.75
No. 2 railroad wrought, St. L	8.25 to 8.50
Arch bars and transoms, Chgo	11.75 to 12.25
Arch bars and transoms, St. L	11.00 to 11.50
Knuckles, coup. & spr'gs, Chgo	8.75 to 9.00
Knuckles, coup. & spr'gs, St. L	8.50 to 9.25
Shafting, Chicago	11.75 to 12.25
Shafting, St. Louis	11.00 to 11.50
Steel car axles, Chicago	11.00 to 11.25
Steel car axles, St. Louis	10.00 to 10.50
Locomotive tires, Chicago	9.00 to 9.50
Locomotive tires, St. Louis	9.25 to 9.75
Cut forge, Chicago	8.25 to 8.75
Pipes and flues, Chicago	6.75 to 7.00
Pipes and flues, Cleveland	7.25 to 7.50

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—

New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama canal	61.9 cents

Pipes and flues, St. Louis	6.50 to 7.00
No. 1 cast, Chicago	9.00 to 9.25
No. 1 cast, Cleveland	10.00 to 10.50
No. 1 cast, Cincinnati	8.50 to 9.00
No. 1 cast, St. Louis	9.00 to 9.25
No. 1 busheling, Chicago	7.50 to 8.00
No. 1 busheling, Cleveland	8.25 to 8.50
No. 1 busheling, Cincinnati	6.00 to 6.50
No. 1 busheling, St. Louis	7.50 to 7.75
No. 2 busheling, Chicago	6.50 to 7.00
No. 1 boiler plate, cut, Chgo	5.50 to 5.75
No. 1 boiler plate, cut, St. L	5.50 to 5.75
Boiler punchings, Chicago	8.25 to 8.75
Cast borings, Chicago	5.00 to 5.25
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.75 to 5.25
Cast borings, St. Louis	5.00 to 5.50
Machine shop turnings, Chicago	5.25 to 5.75
Machine shop turnings, Cleve	5.75 to 6.00
Machine shop turnings, Cinci	$ 4.75 to 5.25
Machine shop turnings, St. L	5.50 to 6.00
Malleable agl., Chicago	7.50 to 7.75
Malleable agricultural, St. Louis	6.50 to 7.00
Malleable, railroad, Chicago	7.75 to 8.25
Malleable, railroad, Cincinnati	7.00
Malleable, railroad, St. Louis	7.00 to 7.50
Angle bars, iron, Chicago	11.50 to 12.00
Angle bars, iron, St. Louis	10.00 to 10.50
Angle bars, steel, Chgo	8.25 to 8.50
Angle bars, steel, St. Louis	8.00 to 8.25
Stove plate, Chicago	8.25 to 8.50
Stove plate, Cleveland	8.00 to 8.50
Stove plate, Buffalo	8.25 to 8.75
Stove plate, Cincinnati	6.50 to 7.00
Stove plate, St. Louis	7.25 to 7.50
Bundled sheet, Cincinnati	4.75 to 5.25

(Gross tons.)

Heavy melting steel, Pbgh	$12.00 to 12.50
Heavy melting steel, Buffalo	10.25 to 10.75
Heavy melting steel, Chgo	9.50 to 9.75
Heavy melting steel, Cleveland	10.25 to 10.50
Heavy melting steel, Cincinnati	9.00 to 9.50
Heavy melting steel, eastern Pa.	11.25 to 11.50
Heavy melting steel, New York	9.00 to 9.25
Heavy melting steel, St. Louis	9.50 to 10.00
Bundled sheet, Buffalo	7.00 to 7.50
Grate bars, Buffalo	9.00 to 9.50
Grate bars, New York	6.50 to 7.00
No. 1 railroad wrought, east. Pa.	12.50 to 13.00
No. 1 railroad wrought, Pbgh	10.25 to 10.75
No. 1 R. R. wght., New York	10.50 to 11.00
No. 1 R. R. wrought, Buffalo	10.00 to 10.50
Shafting, New York	12.00 to 12.50
Shafting, eastern Pa	15.00 to 15.50
Wrought pipe, New York	8.00 to 8.25
Wrought pipe, eastern Pa	10.25 to 10.50
Mch. shop turnings, New York	6.25 to 6.50
Machine shop turnings, Buffalo	5.50 to 6.00
Mch. shop turnings, Pbgh	7.75 to 8.00
Mch. shop turnings, eastern Pa	8.25 to 8.75
Cast borings, New York	5.75 to 6.25
Cast borings, eastern Pa	8.00 to 8.50
Cast borings, Buffalo	6.00 to 6.50
Cast borings, Pittsburgh	8.25 to 8.50
Stove plate, N. J. points	8.00 to 8.25
Stove plate, Pittsburgh	8.25 to 8.75
Stove plate, eastern Pa	9.00 to 9.50
Shoveling steel, Chicago	9.00 to 9.50
Shoveling steel, St. Louis	8.00 to 8.50
Reroll'g rails, 5 ft. & ov., Pbgh	12.50
Reroll. rails, 5 ft. & ov., Chgo	10.00 to 10.50
Reroll. rails, 5 ft. & ov., Cleve	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa	11.50 to 12.00
Reroll, rails, 5 ft. & ov., St. L	10.00 to 10.50
Steel rails, short, St. Louis	9.50 to 9.75
Steel rails, short, Chicago	10.25 to 10.50
Steel rails, short, Cleveland	11.00 to 11.50
Steel rails, short, St. Louis	9.50 to 9.75
Iron rails, Cleveland nom	11.75 to 12.00
Iron rails, Chgo	11.75 to 12.25
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, eastern Pa	13.50 to 14.00
Iron rails, St. Louis	10.00 to 10.50
Iron rails, Pittsburgh	13.00 to 13.50
Frogs, switches, guards, Chgo	9.25 to 9.50
Frogs, switches & g'rds, St. L	9.25 to 9.50
Car wheels, (iron), Pittsburgh	10.50 to 11.00
Car wheels, (steel), Pittsburgh	11.50 to 12.00
Car wheels, Chicago	10.00 to 10.50
Car wheels, eastern Pa.	10.75 to 11.25
Car wheels, Buffalo	10.00 to 10.50
Car wheels, N. J. points	9.25 to 9.50
Car wheels, St. Louis	10.50 to 11.00
Iron axles, Pittsburgh	18.00 to 18.50
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa	18.50 to 19.00
Iron axles, Buffalo	16.00 to 16.50
Iron axles, Chicago	15.25 to 15.75
Steel car axles, New York	11.50 to 12.00
Steel car axles, Buffalo	12.00 to 12.50
Steel car axles, Cleveland	12.00 to 12.50
Steel car axles, eastern Pa	14.00 to 14.50
No. 1 busheling, Buffalo	7.50 to 8.00
No. 1 busheling, Pittsburgh	9.75 to 10.00
No. 2 busheling, Buffalo	5.25 to 5.75
Low phosphorus steel, Buffalo	12.50 to 13.00
Low phosphorus steel, Pbgh	13.75 to 14.00
Low phos. steel, eastern Pa	14.00 to 14.50
No. 1 forge, eastern Pa	8.50 to 9.00
No. 1 cast, eastern Pa	12.00 to 12.50
No. 1 cast, Pittsburgh	12.00 to 12.25
No. 1 heavy cast N. J. points	11.00 to 11.50
Mall. iron, R. R., Cleveland	10.25 to 10.50
Malleable railroad, Pittsburgh	10.00 to 10.25
Malleable R. R., Buffalo	9.50 to 10.00
Malleable, R. R., east Pa	8.50 to 9.00
Bundled sheet, Pittsburgh	9.25 to 9.50
Bundled sheet, Cleveland (nom.)	7.75 to 8.25

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Duplex Process at Maryland Works

(*Continued from page 679.*)

the open hearth furnace, before it was ready to tap, necessitating further recarburizing.

Method C-1.—The method of recarburizing in the open hearth furnace up to 0.70 to 0.90 per cent carbon and catching the heats "coming down", *C-1,* Fig. 4, has no advantage, except that the handling capacity of the transfer ladles is increased by allowing them to be completely filled with blow metal, the recarburizing pig iron being subsequently added to the charge in the furnace.

Method C-2 has been found to give more uniform carbon results in the finished steel. The iron is blown as previously described, but there is not the necessity of keeping the temperature within such close limits as when recarburizing in the converter ladle. The heats can be blown "younger"; the blown metal going into the furnace has the following composition:

	Per Cent.
Carbon	0.10 to 0.15
Manganese	0.10
Phosphorus	0.06
Sulphur	0.04
Chromium	0.20 to 0.30

The furnace, as in the other methods, has been charged with 2 to 3 per cent of burnt lime and 1¼ per cent of roll scale. This requires 30 minutes before the duplex metal is charged. As soon as the blown metal is in the furnace, about 10 per cent of the molten pig is added, which causes the previous dead soft metal in the furnace to take action. As soon as this iron is through the bath a test is taken, which should show approximately:

	Per Cent.
Carbon	0.15 to 0.30
Manganese	0.08
Pho phorus	0.008
Sulphur	0.05
Chromium	0.20 to 0.30

If the heat is hot enough and of the proper analysis, molten spiegel containing 20 per cent of manganese, from the bessemer cupolas, with enough molten iron from the open hearth mixer to give the correct manganese-carbon addition to the heat, is poured into the casting ladle as the heat is tapped from the furnace, as shown in Fig. 3. A good average time for such heats through the furnace is 1½ hours. This, with 40 minutes between heats, gives 10 heats of 62 tons, or 620 tons per furnace, in 24 hours. In following this method, the metal in the furnace must be at a higher temperature than required for the first method, on account of the cooling effect of the addition of the recarburizer in the casting ladle. This requires the furnace to be carried at a higher temperature, with a corresponding shortening of its life. The percentage of lime added is necessarily higher on account of the necessity of carrying a more basic slag to counteract the addition of the recarburizer iron in the casting ladle, with its strong tendency to reduce the phosphorus in the slag back into the metal. A typical slag contains: SiO_2 14 per cent; FeO, 16; MnO, 4; Cr_2O_3, 7; CaO, 45, and P_2O_5, 0.75 per cent.

Output

The maximum week's production at this plant averaged 600 tons per furnace in 24 hours. The maximum daily output per furnace has been 694 tons. In case it should be necessary to duplex on all five furnaces to meet the increased blast furnace output, allowed by the conditions of the market demand for steel products, the limiting factor in this plant would be the capacity of two pit cranes to handle the steel. In the final analysis of any method or furnace, the correct factor of efficiency or speed is the tons of steel made per hour per square foot

of hearth area of the furnace. From weekly averages made at different times, we find this to be 0.11 ton per hour per square foot of hearth area.

When the furnaces were burning gas, no actual figures on coal per ton of ingots on duplex metal were available, but we are able from different runs to give some figures very close to the actual. The figures given for oil are actual meter readings.

1913	Duplexing including heating up.	Cold charge including heating up.
Coal per ton of ingots, pounds	235	1,030
Oil per ton of ingots, gallons..	16	40
1914		
Coal per ton of ingots,	No coal used.	
Oil per ton of ingots, gallons..	12.8	50

The results in 1914 were obtained under very unsatisfactory conditions, the plant operating only five days per week. Deducting the oil used in heating up the furnaces and considering the actual time the furnaces were making steel, we have an average of 9.3 gallons of oil per ton of ingots. Stated in terms of heat units per ton of ingots, we have 9.3 gallons of oil at 150,000 B. T. U. per gallon, or 1,395,000 B. T. U.; assuming the available heat in the gas per pound of coal to be 10,000 B. T. U., we have 1,395,000 divided by 10,000, or 139.5 pounds of coal per ton of ingots.

Life of Furnaces

On account of not duplexing exclusively on any of the furnaces, the following average for three years' operation includes about 33 per cent of the heats made by the pig-iron and scrap method: Furnace roofs, 300 heats; furnace front, 97 heats. The average working time of three furnaces during this period was 5½ days per week. During this time the plant had three extended shutdowns. From observations made as to the wear of the furnaces when duplexing for different periods, we are safe in stating that the furnaces duplexing exclusively will give 500 to 600 heats to a roof, and from 150 to 200 heats to a front.

In making comparisons between the losses in the duplex process and the cold-charge process, the fact must be remembered that the difference is due to the elimination of the carbon, silicon, etc., in the converter, whereas the scrap in the ordinary open hearth process has already withstood such a loss in its original conversion. To satisfy the slag in bessemer conversion 1.75 per cent of the metallic iron is oxidized in the converter. This and the small loss in "shot" are the only losses sustained in the duplex process not common to both processes working with the same materials. The average loss from the bessemer converter charge to open hearth ingots for 1914 was 12.57 per cent.

With the introduction of the duplex process, there arose some criticism as to the quality of the resultant steel. As a rail manufacturer, the Maryland Steel Co. has had a most favorable opportunity of watching the behavior in track of 250,000 tons of duplex steel and 125,000 tons of ordinary open hearth. The results of observations of these rails of practically the same chemical composition and made under uniform conditions of rolling-mill practice, warrant the statement that there is no difference in the quality of the two products.

The Blaisdell Machinery Co., Bradford, Pa., has issued a general catalog devoted to the smaller machines manufactured by this company. The catalog is exceptionally complete and contains many interesting illustrations and descriptions of this company's line of compressed air equipment. Several chapters are devoted to the various uses of compressed air. There are a number of valuable tables which have been prepared for engineers.

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TISCO MANGANESE STEEL CASTINGS
FOR SEVERE SERVICE
Taylor-Wharton Iron & Steel Co.
High Bridge, New Jersey

SMALL STEEL CASTINGS
OF THE BEST QUALITY ARE OUR SPECIALTY. WRITE US.
FARRELL-CHEEK STEEL FOUNDRY CO.
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Rivets, Burrs, Bolts and Screws
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Malleable Iron CASTINGS
Of HIGH TENSILE STRENGTH and EXCEEDINGLY TOUGH *Large or small,* we are equipped to make your castings, and guarantee complete satisfaction It is our business to serve you. Quick delivery our specialty *Write us*
The General Malleable Company
WARREN, OHIO

Opportunities

Men Wanted
Minimum, 50 words, $1.00. Each additional word, 2c. All capitals, 50 words, $1.50. Each additional word, 3c.

Position Wanted
Minimum, 25 words, 50c. Each additional word, 2c. All capitals, 25 words, 75c. Each additional word, 3c.

Miscellaneous Classified
Minimum, 25 words, $1.00. Each additional word, 4c. All capitals, 25 words, $2.00. Each additional word, 8c.

Remittance should be made to cover eight (8) words for address if box number is used.

SAVE YOUR POSTAGE! When answering advertisements, simply address your replies in the usual manner and send to us for reforwarding under one cover.

Men Wanted

WANTED: — GENERAL FOUNDRY foreman for malleable plant employing two hundred and twenty-five molders. Must have experience with automobile and other special work. Give age, nationality and references. Address Box 373, THE IRON TRADE REVIEW, Cleveland, O.

WANTED:—AN ACCOUNTANT, SALES manager, and a superintendent, who are willing to back their ability in the above departments, to the extent that they will subscribe to the capital stock of a successfully operated chilled plow factory. State in first letter experience, salary would expect and how much would invest. Heads of departments must be financially interested. This is not the ad. of an employment broker, but of factory's general manager. Address Box 385, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: — IRON OR STEEL SALESman with following, salary and commission. State experience, etc. Address Box 386, THE IRON TRADE REVIEW, Cleveland, O.

ASSISTANT TO BLAST FURNACE MASTER MECHANIC. One who is competent to care for dynamos, motors, lights and wiring and to do other repair work. Give age, experience and salary expected. State whether married or single and how soon could report. Address Box 388, THE IRON TRADE REVIEW, Cleveland, O.

WANTED—FIRST CLASS IRON FOUNdry foreman, open shop, must have experience on molding machines, dry and green sand and loam work, specialty and jobbing shop, 70 to 100 men, state age, experience, salary expected, send copy of references. Your application will not be considered unless these conditions are complied with. Address Box 390, THE IRON TRADE REVIEW, Cleveland.

WHEN YOU NEED A HIGH GRADE executive, engineer, draftsman or any technical man, consult The Engineering Agency, Inc., (Est. 21 years) 1662 Monadnock Block, Chicago.

UNDERSIGNED COUNSEL WILL CONfidentially negotiate preliminaries for important executive, technical, administrative and professional positions, insuring strictest privacy. Not an agency, but a highly-endorsed, high grade method of negotiating preliminaries only, for $3,000 to $12,000 men. Send address only for explanation. R. W. Bixby, Lock Box 134-E9, Buffalo, N. Y.

THE BEST WAY TO GET A GOOD POsition in drafting or engineering is to file an application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

Positions Wanted

AS FOUNDRY FOREMAN OR SUPERintendent on small steel castings, converter shop preferred. Capable of making cupola charges and blowing heats in converter; also a practical molder; at present engaged, but would make change. Can furnish references. Address Box 362, THE IRON TRADE REVIEW, Cleveland, O.

ANSWER THIS "AD" IF YOU DESIRE a superintendent who can give you efficiency, production, experience and scientific management in your foundry. Address Box 374, THE IRON TRADE REVIEW, Cleveland.

POSITION WANTED AS SUPERINtendent iron or steel foundry contemplating large output; no experiment; particulars with qualifications on request; available April 1. Address Box 363, THE IRON TRADE REVIEW, Cleveland, O.

YOUNG MAN,
very good appearance and address, has considerable engineering experience; has served as a correspondent and traveled as a representative for about a year; is an all round capable party and would be a valuable man to some good progressive concern; will consider any position where a good future can be promised. Address Box 364, THE IRON TRADE REVIEW, Cleveland, O.

EXPERIENCED PATTERN MAKER wishes position as foreman; over 10 years in charge of shops employing from 20 to 100 men making patterns for gas and oil engines and electrical machinery. Broad experience with molding machines. Address Box 253, THE IRON TRADE REVIEW, Cleveland, O.

MR. MANUFACTURER: WOULD YOU consider employing a first-class draftsman to help increase business? Am 28; technical education; hustler; 8 years' experience on steel mill, hydraulic and electric crane machinery; best of references if desired; wish position with chance of advancement. Address Box 365, THE IRON TRADE REVIEW, Cleveland, O.

SKELP ROLLER, 17 YEARS' EXPErience; first class mechanic; careful worker; best references; inventive ability; also knows proper drafting of rolls; desires position with good firm. Correspondence solicited. Address Box 298, THE IRON TRADE REVIEW, Cleveland, O.

MERCHANT-ROLLER, 15 YEARS' EXperience in guide and bar, Belgian and continuous trains. Qualified to turn and design rolls. Particulars as to qualifications on request. Correspondence solicited. Address Box 375, THE IRON TRADE REVIEW, Cleveland, O.

AS FOUNDRY SUPERINTENDENT OR manager; graduate in metallurgy and mix by analysis; have wide experience on loams, dry and green sand in brass, bronze, steel and iron; expert on molding machines and metal plates; estimating; wood and metal pattern-making; spent 5 years as chief foundry engineer and adviser in U. S. Navy yard; age 37, married; can furnish highest references. Address Box 380, THE IRON TRADE REVIEW, Cleveland, O.

PUBLICITY MANAGER—EXPERIENCED. Thoroughly familiar with mechanical and engineering subjects. Expert writer, advertiser and catalog maker. Address Box 389, THE IRON TRADE REVIEW, 90 West street, New York.

POSITION WANTED:—ROLL TURNER; will take charge of turning; 20 years' experience on tin, sheet, jobbing and plate mills. Looking for something permanent; highest references. Address Box 382, THE IRON TRADE REVIEW, Cleveland, O.

CHEMIST: ENERGETIC, PROGRESSIVE, thoroughly experienced and competent in all blast furnaces and steel works; analytical requirements; excellent references. Available immediately. To take charge of blast furnace, laboratory preferred. Address Box 383, THE IRON TRADE REVIEW, Cleveland, O.

LABOR SUPERINTENDENT OPEN FOR position; years experience. Open hearth furnaces and gas producers; accept day or night position; can produce results. Address Box 384, THE IRON TRADE REVIEW, Cleveland, O.

AN A 1 MALLEABLE SUPERINTENDent wishes a position with a modern firm requiring top-notch services. Address Box 381, THE IRON TRADE REVIEW, Cleveland.

POSITION WANTED AS GENERAL SUperintendent steel plant, open hearth or blooming mill; graduate Massachusetts Institute Technology in mechanical engineering and metallurgy; 17 years' experience; 8 years as assistant general manager steel corporation; open for engagement April 1; highest quality reference. For full particulars and interview Address Box 370, THE IRON TRADE REVIEW, Cleveland, O.

MECHANICAL ENGINEER; TECHNIcal training; 18 years' experience gas engines, machine tools, mill buildings, hydraulic machinery, ordnance work; 14 years in charge of work; 6 years as superintendent; can fill position of superintendent or chief engineer; good references. Address Box 341, THE IRON TRADE REVIEW, Cleveland, O.

Opportunities

F. H. POWNALL IRON WORKS, Jamesburg, N. J., established 1888; all kinds of gray iron, semi-steel, brass, bronze and aluminum castings from one ounce to five tons. Send your blue prints or patterns for estimates.

300 ACRES OF WATER FRONT PROPerty on Maumee Bay within easy reach of Toledo, and admirably located for shipping by water. If you are interested, correspond with Frank B. Niles, Owner, Box 324, Toledo, O.

FOR SALE: — FOUNDRY AND MAchine shop in Kansas City. Established 25 years. Doing $100,000 to $125,000 business yearly. One and one quarter acres land, brick buildings, located in the center of manufacturing district. Have practically a monopoly on architectural castings in this city, and making a large amount of machine castings. Can make very attractive price and terms. Address Box 378, THE IRON TRADE REVIEW, Cleveland, O.

PATENTED MACHINE IN SUCCESSful use for four years by large steel works, cement plants, coal docks, general contractors, U. S. government, etc.; sells for $400 to $3,000 each according to size. Owner has no factory, nor sales organization. A concern having manufacturing facilities (medium heavy plate work and machine shop equipment) with proper sales agencies can develop profitable addition to present business. Will make deal for reasonable payments. Address Box 367, THE IRON TRADE REVIEW, Chicago.

WANTED:—TO RENT OR TO BUY small foundry. Or would consider investing with services in larger plant. Address Box 387, THE IRON TRADE REVIEW, Cleveland, O.

WANTED TO HEAR FROM OWNER OF good hardware or implement store for sale. Send price and particulars. D. F. Bush, Minneapolis, Minn.

FOR SALE:—MACHINE SHOP MANUfacturing a line of high grade engine and pattern makers' lathes, and a new type of drill press that has no superior as a cost reducer; capital required not less than $30,000. Address Box 366, THE IRON TRADE REVIEW, Cleveland, O.

FOR SALE.
TURPENTINE—ROSIN PLANT. WOOD distillation. In Lake Charles, La. Wood, cheap, abundant. Sell half or all. Exceptional opportunity. Particulars, M. P. Erwin, Lake Charles, La.

Classified Advertisements continued on following page